THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION

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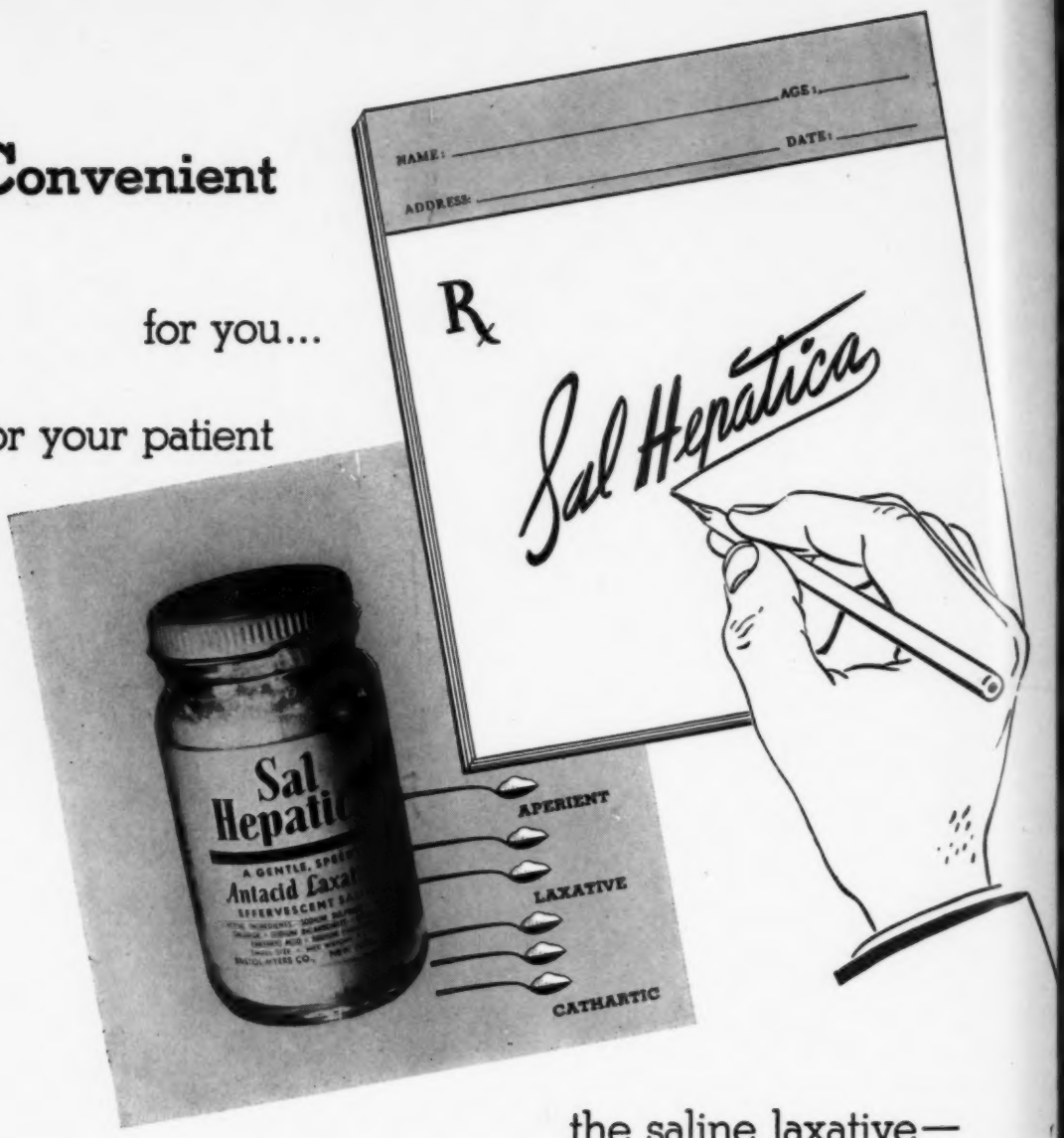

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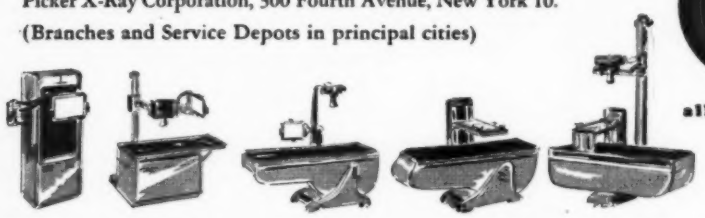

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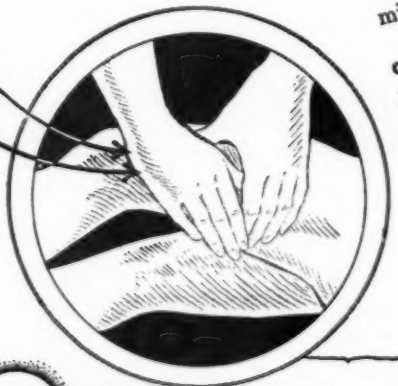

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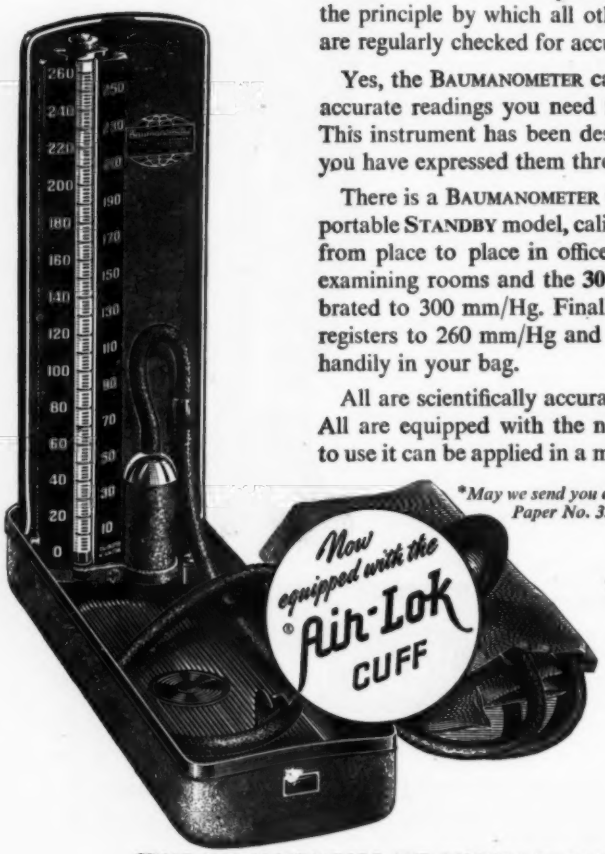

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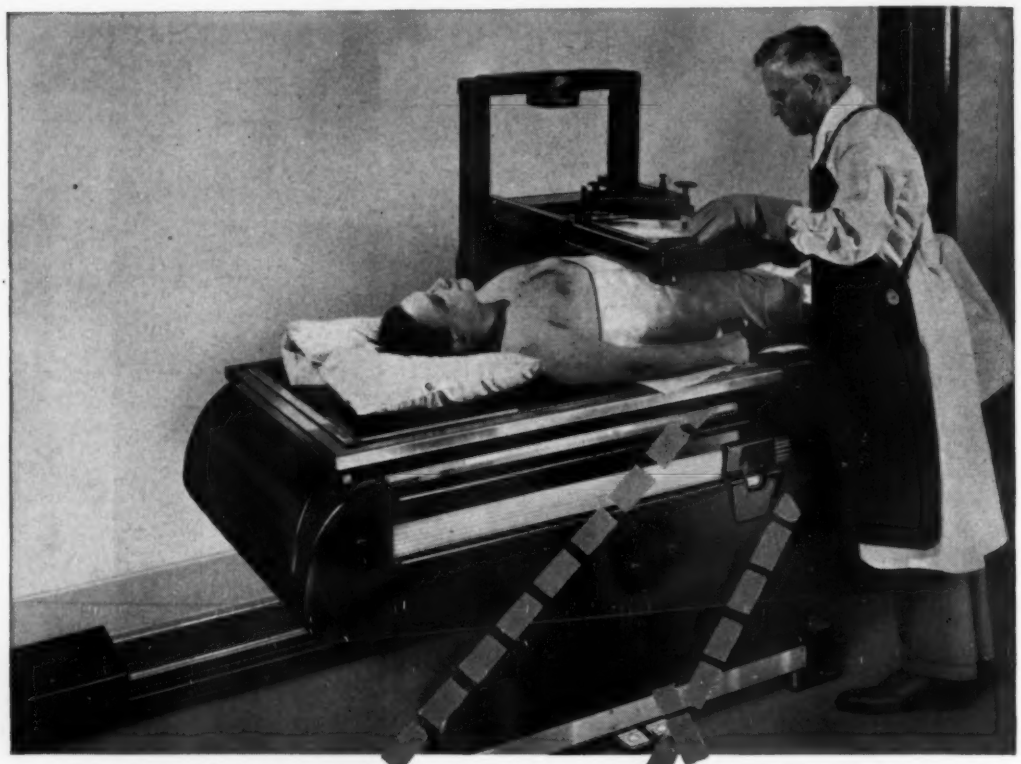

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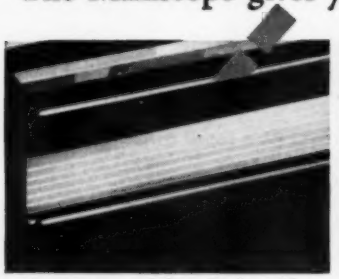

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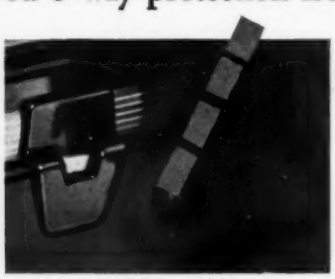

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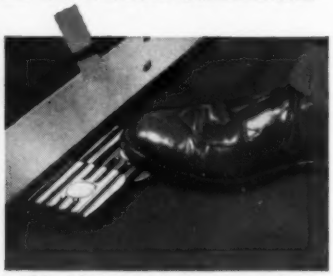

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ALRACOMP also provides

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Packaging: 100, 500 and 1000.

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Alrac AND *Alracomp*

when pregnancy is contraindicated . . .

A COMPARATIVE STUDY

THE EFFICACY OF THE SUPPOSITORY FOR CONCEPTION CONTROL

"Hence, the conclusion would seem inescapable that these latter methods—especially the suppository, the simplest of them all—deserve more widespread trial than they have heretofore received."*

The Suppository Technic.—In a Baltimore clinic, use of the simple, Lorophyn Suppository technic produced a rate of *16.2* pregnancies per 100 woman-years of exposure to the opportunity of becoming pregnant. This rate was compared to some reported in the literature with diaphragm and jelly: 12, 15, 18 and 33. Over 300 patients were studied for periods of from six months to over two years.

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Lorophyn® Suppositories (N.N.R.) contain phenylmercuric acetate 0.05% and glyceryl laurate 10% in a water-dispersible, self-emulsifying, synthetic wax base. Hermetically sealed in foil, they will not leak in hot weather.

*Eastman, N. J. & Seibels, R. E.: *The Efficacy of the Suppository and of Jelly Alone as Contraceptive Agents*, J. A. M. A. **139**:16 (Jan. 1) 1949.

Reprint on request.

EATON LABORATORIES, INC., NORWICH, N. Y.

When a jelly is preferred—**LOROPHYN JELLY (N.N.R.)** also contains the powerful spermicide: phenylmercuric acetate 0.05%, and polyethylene glycol of mono-iso-octyl phenyl ether 0.3%, methyl p-hydroxy benzoate 0.05% and sodium borate 3% in a special jelly base.

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You can prescribe the combination of milk, water and carbohydrates that fits each baby's individual needs — secure in the knowledge that Carnation Evaporated Milk *never varies*. And you know it is absolutely safe. For it is not only pasteurized, but sterilized *after* the airtight can is sealed. There are no "unknowns" in the formula to cause complications at this critical stage of the infant's life.

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Delicate little digestive systems are still easily upset after baby goes off formula, so Carnation's absolute uniformity continues to be an important safeguard. And Carnation diluted with an equal amount of water is nourishing whole milk in its most digestible form. For Carnation is homogenized and heat-refined—is *soft-curd* milk that the baby can readily assimilate.

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Here's an important plus all doctors (and mothers!) appreciate: When *familiar-tasting* Carnation is used in the cup, baby makes the radical change-over from bottle-feeding with far less resistance. And here again, Carnation's constant uniformity in butterfat, milk solid content, curd tension, and viscosity is a positive factor in eliminating the possibility of digestive upsets.

Complete control — that's the secret of Carnation's absolute uniformity. Every drop comes from cows checked by Carnation's own inspectors... is tested in Carnation's own receiving stations... is pasteurized and processed with prescription accuracy in Carnation's own evaporating plants. There is no finer, safer milk for babies... none that gives you better control over all three stages of baby's feeding. When you recommend Carnation *by name,* you specify the milk that has been a standard among doctors for over half a century.

8 out of 10 mothers raising their babies on Carnation report that it was recommended by their doctor

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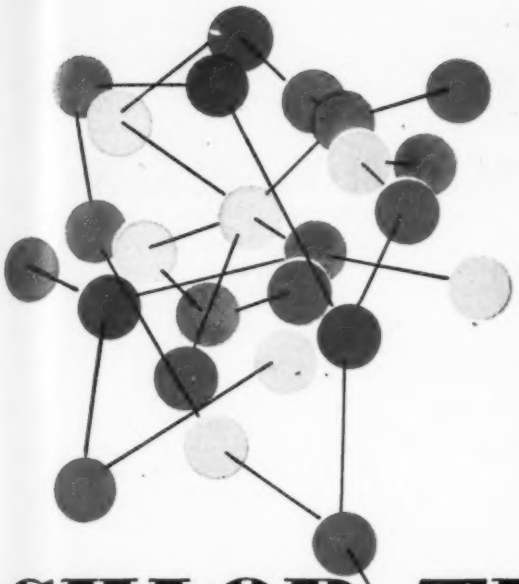

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By scientific rearrangement of molecular configuration our chemists have produced the most potent antihistamine known. So effective that only 2 to 4 mg. are required, Chlor-*Trimeton** Maleate brings to the allergy sufferer more rapid and more prolonged relief. Because so small a dose is needed for a therapeutic effect, side actions are relatively infrequent.

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(brand of chlorprophenpyridamine maleate)

Chlor-*Trimeton* is indicated for symptomatic control of hay fever, perennial allergic rhinitis, urticaria, angioedema, atopic eczema and dermatitis, and antibiotic sensitivity reactions. It is valuable as an adjunct to specific hyposensitization procedures where it should be given one-half hour prior to injection. Chlor-*Trimeton* allows higher dosage of antigen to be administered and also serves to minimize possible constitutional reactions.

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Breakfast . . .

AND THE SPECTER OF WEIGHT GAIN

The all too common practice of breakfast skipping to prevent weight gain has again been shown to be detrimental.

In two studies recently concluded at the medical college of a prominent university, women subjects were placed on breakfasts supplying 300, 600, and 1,000 calories, and men subjects on a breakfast providing 750 calories; they were also observed during periods when breakfast was withheld entirely. Free choice was allowed in the selection of foods comprising the other two meals.

In all subjects—men and women alike—no significant weight changes were observed at any time, either during the "no breakfast" periods or when breakfast provided as much as 1,000 calories. Evidently, caloric intake during the other two meals was automatically adjusted to satisfy energy needs. In addition, omission of breakfast decreased mental acuity and maximum work output during the pre-noon hour, thus indicating a decidedly undesirable physiologic insult to the organism.

The 600 calorie breakfast used as one of the experimental morning meals was a widely accepted basic breakfast pattern consisting of fruit, cereal, milk, bread and butter. Containing virtually all essential nutrients in balanced proportion, this breakfast is satisfying and economical. It is particularly suited to supplying the amounts of nutrients and calories breakfast should provide, and is not necessarily conducive to weight gain.

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†Potencies and balance cover latest standards for multiple therapeutic dosage. 1. Rehabilitation Through Better Nutrition, 1947—Spies. 2. Journal of American Medical Association, Oct. 27, 1945; 129:613—Jolliffe. 3. Vitamin Deficiencies: Stigmas, Symptoms and Therapy (J. A. M. A., June 22, 1946; 131:666—Council on Foods and Nutrition).

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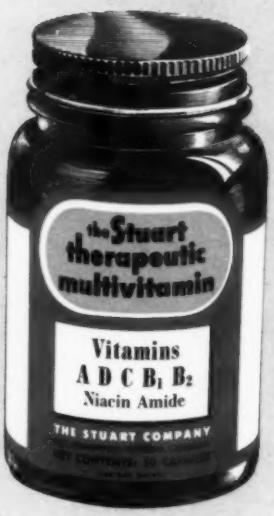

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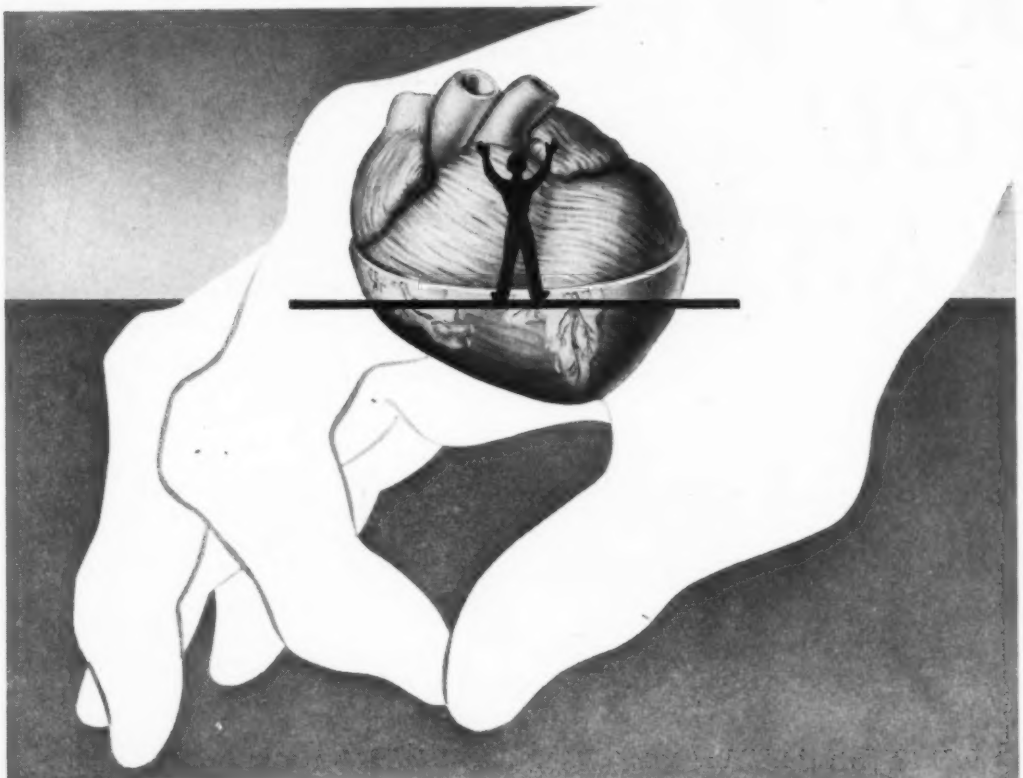
Proc. Soc. Exp. Biol. and Med., 1934, 32, 241-245; N. Y. State Journ. Med., Vol. 35, 6-1-35, No. 11, 590-592; Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154; Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60



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1. Gordon, E. S.: Nutritional and Vitamin Therapy in General Practice, Year Book Pub., 3rd ed., 1947. 2. Manchester, T. C.: Food Research, 7:394, 1942. 3. McLester, J. S.: Nutrition and Diet, Saunders. 4th ed., 1944. 4. Rose, M. S.: Rose's Foundation of Nutrition, rev. by MacLeod and Taylor, Macmillan, 4th ed., 1944. 5. Sherman, H. C.: Chemistry of Food and Nutrition, Macmillan, 7th ed., 1946.

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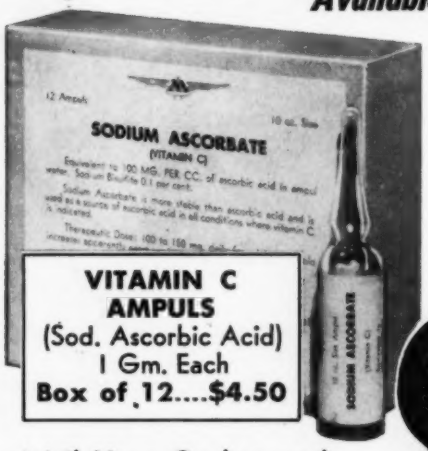

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This monograph is written for those who have not previously given serious consideration to the application of measurements of venous pressure to clinical problems. It is designed to arouse interest in these observations so that those unfamiliar with the subject might better understand and manage their patients. Dr. Burch presents those fundamental principles concerned with the maintenance of and fluctuations in venous pressure. These principles are carefully considered, both in normal and disease states. *Indirect* methods of measuring venous pressure which are adaptable to bedside use, and the *direct* method, which is the author's specialty, are explained fully. Congestive heart failure, varicose veins, shock and other abnormal clinical states which affect determinations, and the mechanisms involved, are discussed in a separate chapter.

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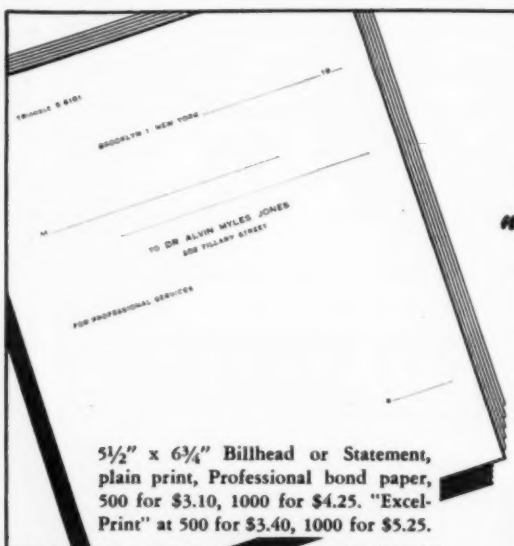

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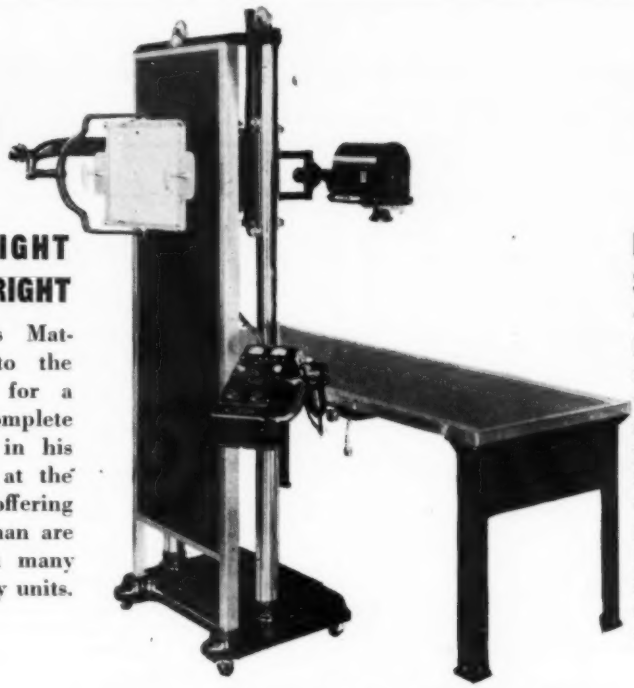

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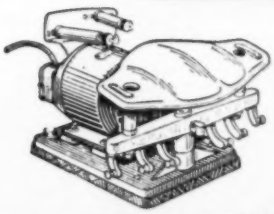

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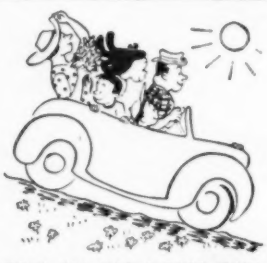
2

IT'S A HAPPY DAY BUT

THE O'NEILLS SHOULD HAVE SELECTED ANOTHER SPOT— AWAY FROM THAT PARTICULAR BUSH. THEY'LL PAY FOR THEIR IGNORANCE TOMORROW... ALL BUT LITTLE JANEY, WHOSE MOTHER KNOWS A THING OR TWO ABOUT PRETTY GREEN LEAVES AND PROTECTION AGAINST 'EM!



3

THEY ALL HAD A GOOD TIME BUT

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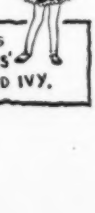

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Osteopathic Research Contributions to Medical Science

S. V. ROBUCK, D.O., D.Sc.
Chicago

The introduction of a basic principle that has greatly changed the common trend of thought and practice and initiated new approaches to health and disease problems has not frequently occurred in the history of the healing art. Such a radically divergent concept of etiology and therapy as is inherent in the rationalization presented by A. T. Still was, and still is, revolutionary. However, in relation to other transitions in the history and long existence of mankind, Still's ideas are rapidly taking sound root and fast becoming accepted.

The greatest contributions of early medical investigators came about largely through evaluation of many things that could be studied in contacts with substances, phenomena, or courses of events related to the particular phase of facts or factors under analysis. As Antonj Van Leeuwenhoek by his discovery of the microscope made visible things in the presence of which man had been living since his appearance on earth, so did Still bring to consciousness the existence of laws of health that, as he said, were "as old as the universe"[1]—he had but to discover them.

Still's observations, tested by intelligent studies of the relation of body structures and their interrelationship with body functions, formed the foundation of a radically new approach to health and disease problems. The acceptance, sometimes partial but oftimes complete, of some of his findings is constantly appearing in clinical reports, articles, and books dealing with basic studies in the mechanisms of diseases and in therapeutic procedures, the authors of which are scientists or members of the so-called "regular school of medicine."

The concepts of immunity and curative powers inherent in body tissues and fluids and their control through nerve impulses and body fluids and the direct mechanical effects on physiological processes occupy an important position in biological, biochemical, and bioelectrical, as well as clinical, investigation. Those who investigate the modus operandi of normal and pathological physiology very often must take into account the influences of structural order or disorder.

Still observed that "cells of the blood move with the intelligence of the stars of heaven."[2] Metchnikoff and Ehrlich pioneered in laboratory technics and observations that have been elaborated upon by thousands of investigators who have accepted the specificity of cellular behavior. Investigators are still engaged in a struggle to gain greater understanding of cellular physiology so therapy may be specifically applied and restoration of health as well as relief from suffering or disability may be afforded victims of numerous types of illness.

Those principles given to the world by Andrew Taylor Still were broad and yet specific. At times their application brought about results that were, and are, miraculous—miraculous because we still have too limited knowledge of the ways of body functions to be entirely rational in our analysis of causes and effects. Whatever follows in our attempts to understand the osteopathic concept will be based upon fundamentals that are fixed, changing only insofar as environmental and nutritional factors enter into the complexity of causation of diseases or disease states.

Still[3] pointed out and demonstrated that eye disorders could be related to deviations from the normal of intervertebral structures in the upper one-third of the spine. Mental derangements responded to his methods. Victims of specific infections recovered in less than customary time and with fewer complications. Metabolic diseases abated or became arrested. Much of what he observed as a result of the application of osteopathic therapeutics could be possible only if those things he considered factual actually did exist.

In this day so much research is carried on in the laboratories that there is a tendency to lose sight of the fact that the testing ground is the clinical field where ideas, concepts, theories, materials, et cetera can be put to work on actual and practical problems. On this basis, Still's contributions to fundamental knowledge, of which he made thousands, have withstood testing. Thousands of other individuals also have applied the basic principles he gave and have experienced success in millions of instances.

The studies of animals, cadavers, skeletons, and humans conducted by A. T. Still are of the highest order of research. James Mackenzie, William Osler, and many other physicians of their era relied largely upon similar studies and their pronouncements and descriptions continue to stand the test of so-called modern research technics. Even Hippocrates, without any laboratories at his command, established information that constitutes acknowledged fact today. Still's

research is outstanding in medical history. Because of his contribution, lives have been saved, continued disability prevented, and economic independence of hundreds of thousands of persons has been made possible.

Not being satisfied with the fact that human beings make both commonplace and phenomenal recoveries following the application of osteopathic principles, various osteopathic physicians and research workers have engaged in laboratory and/or clinical studies to clarify the modus operandi of the influences of the osteopathic lesion. First of all, it was desirable to know what anatomical macroscopic and microscopic changes are incident to the osteopathic lesion locally, that is, about a lesioned joint, or remotely, that is, in tissues or organs affected via neurogenic structures. The nerves themselves have been studied and variations from the normal noted. Furthermore, new nerve paths from the upper dorsal to the eye were discovered, suggesting the possibility of the existence of numerous undiscovered pathways from one part of the body to another or to a viscus from the somatic areas. Such studies have been carried on principally by Louisa Burns[4] and her assistants. She has spent about 47 years at this work and has used thousands of animals —rabbits, rats, dogs, cats, goats and others. Besides, she has conducted extensive observations in human beings. Her book, "Pathogenesis of Visceral Disease Following Vertebral Lesions,"[4] summarizes considerable of her work but by no means all. Numerous articles have appeared in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION.

Numerous are the attempts to explain "developmental anomalies." There undoubtedly are many causative factors. It is noteworthy that Burns[4] found there is a relationship between the incidence of experimentally produced lumbar lesions in male and female and the development of their progeny. Abnormalities in progeny occurred so frequently that it could not be accepted as a coincidence. A happening that is a coincidence occurs occasionally or rarely. If it occurs frequently, it is not a coincidence.

Besides the extensive studies by Burns and her associates, others have followed through in making worthwhile studies.

Carl P. McConnell[5] assisted by Frank C. Farmer studied tissue tensions about a lesioned joint and found that the tension increased from top layers of muscles down to and including capsular ligaments. McConnell observed changes in nerve structure and spinal cord circulation in regions of spinal lesions.[6]

John Deason[7] and his collaborators studied visceral effects of experimental spinal lesions, particularly in relation to the thyroid, kidneys, carbohydrate metabolism, and liver secretion of bile. These experiments included studies of the effect upon the rate of bile flow and urinary output resulting from spinal stimulation. Visceral pathology associated with experimental lesioning was recorded.

Deason[8] made an outstanding contribution in the treatment of eustachian tube deafness and other intranasal pathologies. This work was on a clinical basis utilizing cadaveric specimens for anatomical studies. Others, including J. D. Edwards, C. C. Reid, T. J. Ruddy, and C. Paul Snyder, have followed in the field and have developed technics that have helped thousands of patients.

E. R. Hoskins[9] did original work utilizing the x-ray in studying experimentally produced lesions. He developed a technic by which the soft tissue changes about an experimentally produced spinal lesion in a rat or guinea pig could be recorded on film. Later,[10] he established a technic and procedure for filming mechanisms due to short leg and for accurately measuring the amount of shortening. He was first accurately to record x-ray filming of the full stature of the human anteroposteriorly and laterally, thus establishing scientific criteria for determining correct and abnormal posture. Further, these researches established an acceptable means of diagnosis and criteria for applying treatment of scoliosis, unleveling of the sacrum, short leg, and other mechanical defects in human beings.

J. S. Denslow[11] and I. M. Korr[12] have made outstanding contributions in the bioelectrical field. They have used electromyography in the study of normal and abnormal muscle—the latter particularly related to spinal osteopathic lesions. This work establishes a background for studying many phases of disordered viscerosomatic, somaticovisceral, and somaticosomatic phenomena. The full import of these findings can be unfolded only as the work progresses and is applied to specific clinical problems. It constitutes basic scientific research.

The study of the pathologies incident to spinal osteopathic lesions is also basic. Wilbur V. Cole[13] has been and is engaged in the investigation of such pathologies. His experiments are similar to those conducted by Burns. Further, Cole has made observations of motor end plates, which studies, it is believed, will provide valuable information as research progresses in several approaches to the studies of the relation of the spinal osteopathic lesion to disordered body function and the development of pathology.

CLINICAL STUDIES

A list of purely clinical studies that have made valuable contributions would include many projects undertaken by many investigators.

Lillian M. Whiting collected data that showed a relation of osteopathic manipulative therapy to the reduction of duration of labor and of complications.[14,15] A composite report[16] on nearly 14,000 maternity cases showed that under the care of osteopathic physicians there was a substantial reduction from current mortality rates for mothers and infants.

More recently, Wayne Dooley[17] reported 250 maternity cases showing a reduction of duration of labor when osteopathic manipulative treatment was administered prenatally.

Through the years reports have been made and published in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION and other osteopathic publications on results obtained by the application of osteopathic manipulative therapy in many disease entities —from the common cold through the influenza and pneumonia of one of history's worst epidemics. Reports have included scarlet fever, poliomyelitis, low-back problems, cardiac conditions, postoperative complications, and many other problems. These reports show that osteopathic manipulative therapy is an important factor in the care of patients whether suffering from surgical or nonsurgical conditions.

An outstanding recent contribution to medical science is the new approach to physiological influence through technics designed to alter intracranial membranous tensions, intracranial circulation and the flow of cerebrospinal fluid.[18] Charlotte Weaver[19] and William G. Sutherland[20] pioneered in this field, making some striking observations. Until Weaver and Suther-

land began their studies, little attention had been accorded the function of the choroid membranes or the flow of cerebral fluid through the cerebral ventricles and the arachnoid space or the relation of cerebral fluid to the function of the nasal membranes and the inner ear. Since Sutherland's clinical demonstrations have been such as to demand further investigation, studies, both in the laboratory and clinical, are now in progress and data are being collected.

Results so far promise to open new studies in the function of various brain centers in controlling general body functions, such as metabolism, regulation of temperature, blood pressure, emotional states and even regulating functions of other centers in the brain stem. Thousands of newborn infants have been studied and over 10,000 cranial manipulative treatments have been administered. This is a new approach to the problems of the infant and child.

Burns[4] has found circulatory changes in the pituitary, meninges, and brain substance following experimentally produced atlas lesions in animals. The moulding of the head and excessive pressure on the head being forced through the birth canal results in lesioning of the basilar bones of the skull and the occipital and atlas bones. What effect prompt correction of these anatomical faults will have upon the development of the child will require years to comprehend. That there is an immediate value is already evident.

CONCLUSION

Much more specific data could well be included in this discussion, but even to catalogue every worthy contribution would require more time and space than is presently available. The record of osteopathic research, laboratory and clinical, is of great significance, and enough has been accomplished at both levels to rate osteopathic research as one of the most important projects in medical science today.

Tangible results have been attained with, relatively speaking, a small amount of finances and limited facilities and personnel. In the interest of humanity the amount of laboratory research and clinical investigation now in progress should be increased, in the immediate future, tenfold. Disease processes having subtle and little understood backgrounds are gaining in their attack on mankind. Some of the basic etiological factors have been shown to be related to the osteopathic lesion complex. Research concerning the osteopathic lesion factor can save life and help maintain economic equilibrium for the individual, the family, the community, and the Nation.

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EFFECTS OF ATOMIC BOMB EXPLOSION

The effects of the burst of an atomic bomb upon people are essentially the same as those caused by an amount of TNT that releases an equivalent total of energy, but with certain added factors. Mechanical injuries suffered in the collapse of buildings will predominate in both cases. The main differences are first, the greater amount of radiant heat released by an atomic explosion; second, the large amounts of light, including ultra-violet; and third, the large amounts of nuclear radiation.

Injuries to people from an atomic bomb can be divided into four general categories—those caused by the blast pressure wave directly; those caused when buildings are wrecked; those caused by burns either in the wreckage or from radiant heat; those caused by nuclear radiation, either directly or through residual contamination.

In the case of an underwater blast, the water absorbs the radiant heat, light and nuclear radiation, hence direct injuries from these sources do not occur. The contamination absorbed by the water is, however, spread whenever a base surge is formed.

In the case of such a high air blast as in Japan, some 15 to 20 percent of the deaths probably will be caused solely by nuclear radiation. The remaining 80 to 85 percent will be caused primarily by injuries suffered in the collapse of buildings and by burns, although many of these also suffered severe radiation exposure.—Report prepared for the National Security Resources Board by the Department of Defense and the United States Atomic Energy Commission.

The Effects of dl-Methionine and Some Members of the Vitamin B Complex on Migraine*

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The comment is frequently found in the literature[1-4] that at least one of the etiological factors of migraine is metabolic in origin. Reports have recently appeared implicating faulty hepatic function as a frequent cause in disorders of metabolism.[5,6] Accordingly, it seemed that therapeutic measures designed to restore or support normal hepatic function might be useful in the prevention or relief of some migraine headaches. This is a report of the effects obtained in the treatment of migraine by the administration of different nutritional elements selected because of their influence on hepatic function.

EXPERIMENTAL WORK

Forty-three patients, 31 females and 12 males, between 18 and 43 years of age have been under treatment for an average of 11.2 months.

Diagnosis.—This was established on the criteria of Alpers[1] as stated in the following quotation:

> . . . The diagnostic characteristics of migraine in the order of their diagnostic importance are as follows (von Storch): (1) Recurrent headache, preferably, but not necessarily hemicranial in type. Recurrent paroxysmal headaches are the foundation of the disease. Constant headaches are not of a migrainous nature except under special circumstances to be considered; (2) associated visual symptoms; (3) gastrointestinal symptoms, usually nausea and vomiting; (4) hereditary migraine diathesis. Not all the criteria listed may be found in a typical case, but the presence of recurrent headache associated with one of the other features must be present before the diagnosis can be considered, and at least three features must be present for the diagnosis to be made with any degree of certainty.

All the patients in our series had had their malady for 4 years or more prior to the initiation of treatment and had had previous diagnoses of migraine made elsewhere. Nevertheless, cranial neoplasia, neurosyphilis and similar disorders were excluded by appropriate examinations. Because it has been observed[2] that migrainous attacks are often associated with the menses, special notice was given to this point.

Treatment.—†Because of its effect on hepatic function[7-10] 1 gram of dl-methionine was administered daily in three divided doses to all patients for 1 month. Reported improvement, as judged by a decrease in the frequency or severity of attacks, was followed by an attempt to regulate the dosage so as to maintain the relief or to keep residual symptoms at a minimum. The maintenance dose established varied according to the patient. It was usually found useful, however, to increase the daily dose, sometimes to as much as 2½ grams, immediately prior to an expected attack.

Besides methionine the investigations of Biskind and others[11,12] suggested that some of the B vitamins might be useful in correcting faulty liver function. Accordingly, a preparation was made, each capsule of which contained the following: niacinamide, 100 mg.; riboflavin, 40 mg.; thiamine chloride, 20 mg.; pyridoxine hydrochloride, 40 mg.; and, as a filler, starch, 40 mg.‡ Ordinarily, one capsule was given daily for 2 weeks or longer, depending on the severity of the attacks. As in the case of methionine, an attempt was made to establish a maintenance dose. This varied quite widely, but averaged about 1 capsule a week. It was found beneficial to administer 2 capsules on the occurrence of prodromal symptoms.§

The observed results are shown in Table I.

Controls.—The nature of the disease and the rarity of spontaneous remissions within the age group treated reduces the need for controls. However, the psychological effect of treatment is well known and could be expected to be especially marked in a condition which is often held to have a large psychogenic component.[13,14] Therefore, 10 females and 5 males who had already shown marked improvement were given placebos instead of their usual medications. These patients had been under treatment from 6 weeks to 3 months when the substitution was made. All relapsed to different degrees and in different lengths of time. Less time was required for the relapse of the 5 females in whom the attacks were associated with the menstrual cycle.

In order to ascertain the effects of the medications employed, each was administered to a different group of apparently normal individuals in the manner already described. Methionine seemed to have no effect on any of the subjects, except a subjective feeling of well-being. The medication containing the members of the vitamin B complex did not seem to have any pronounced effect on the males in the control group, except a subjectively reported increase in appetite. The females, with two exceptions, reported disturbance or derangement of the menstrual cycle, presumably as a result of the large doses of the selected B vitamins. The symptoms were so marked that the use of the preparation had to be discontinued. The 2 females in whom these effects were not noted, stated on the other hand, that their menses were much easier because of relief from the occipital headache, painful breasts, and premenstrual tension, which had formerly accompanied the menstruations. Recent work[15,16] on the effect of the B vitamins on the estrogen level offers an explanation of these phenomena.

CONCLUSION

In order to facilitate the interpretation of the data of Table I, they were statistically studied according to Fisher's methods for small samples.[17,18] There are probably a sufficient number of cases to justify some

*The work herein reported was done in the hospitals and clinics of the Kirksville College of Osteopathy and Surgery.

†The vitamins used in this study were products of Merck and Co., Rahway, N. J. The dl-methionine was procured from Interchemical Corp., Union, N. J.

‡This preparation was made with the aid of H. Mangold in the Laboratory of Biological Chemistry of the Kirksville College of Osteopathy and has been designated NRTP. It has since been found less costly to use a less concentrated preparation called Pyrithamide, which has the same action.

§Gynergen and other medications usually employed in the treatment of migraine were not permitted during the course of treatment described.

TABLE I.—Effect of Selected Treatment on Frequency and Severity of Attacks of Migraine

a. Female patients whose attacks seemed to be associated with the menstrual cycle

Patient	Age	Frequency of Attacks-Number per Month: Before Treatment	Frequency of Attacks-Number per Month: After Treatment	Degree of Decrease in Pain: Estimated %	Duration of Treatment in Months
1	23	3	1	75	12
2	41	3.5	2	50	18
3	43	2.25	0	100	6
4	37	3	0	100	5
5	27	1.5	0.1	50	13
6	32	1	0.5	75	18
7	26	1	0.125	75	24
8	35	2.5	0.5	00	5
9	21	2	0	100	18
10	18	2.5	2	25	6
11	19	2	1.5	00	15
12	24	3.25	0.25	50	17
13	39	1	0.142	50	23
14	40	3	2	25	10
15	32	2	1	50	17
16	33	2	0.5	75	6
17	34	3	0	100	8
18	26	1	0.5	25	6
19	22	1.5	0.11	50	18
Mean (M):		2.15	0.64		
Sigma (σ):		±0.79	±0.72		

D = 0.253; N = 5.8; and P = 1.16×10^{-5}%

b. Female patients whose attacks did not seem to be associated with the menstrual cycle

20	29	4	1	50	13
21	34	2.25	0	100	5
22	38	3.5	1	75	8
23	42	1	0	100	6
24	37	1	0.1	50	10
25	29	3.5	0	100	11
26	30	2	1.5	50	22
27	38	4	2	00	6
28	21	1.5	0	100	4
29	25	1	0.5	25	6
30	40	2	2	00	5
31	43	1	0.25	25	8
Mean (M):		2.23	0.69		
Sigma (σ):		±1.21	±0.76		

D = 0.431; N = 3.5; and P = 4.65×10^{-2}%

c. Male Patients

32	37	6	1.5	00	12
33	36	1	0.125	50	17
34	39	10	1	50	12
35	42	8	3.5	50	16
36	34	1.25	1	75	6
37	24	4	4	00	8
38	35	3.5	0	100	10
39	41	7	2.5	25	15
40	27	3	0.33	00	5
41	31	1.5	0.5	00	18
42	29	2.5	1	00	9
43	36	4	2	25	7
Mean (M):		4.31	1.46		
Sigma (σ):		±2.86	±1.19		

D = 0.935; N = 3.0; and P = 1.94×10^{-1}%

Total Mean(M):	2.77	0.88	
Total Sigma(σ):	±1.77	±0.97	

D = 0.335; N = 5.6; and P = 2.30×10^{-5}%

confidence in the statistical results obtained for the whole group of patients. The sub-groups a, b, and c are, however, so small that the statistical analysis must be considered only as indicative, rather than conclusive.

Since the probability of the results for the whole series of cases being due to chance is very small ($P = 2.3 \times 10^{-5}$%) it can be concluded that the administration of methionine and selected components of the vitamin B complex is of value in reducing the number of attacks of migraine. It is noteworthy that only 2 patients had no reduction in the number of attacks and no subjective relief.

It seems that these medications are somewhat more effective in reducing attacks associated with the menstrual cycle than they are in the treatment of those of other female patients. They are, however, a little more useful in the treatment of groups Ia and Ib than they are with male patients.

Table I. The frequency of attacks is given in number of attacks per month; as examples, 3.5 means seven attacks during a 2-month period and 0.142 means one attack during a 7-month period. The figures given are probably more accurate for the period after the institution of treatment than before.

The degree of decrease in pain accompanying the headaches experienced after the initiation of treatment is a subjective estimate by the patient and as such is included merely as an indication of effect.

The statistical treatment used is that of Fisher for small samples[18] and is explained as follows: The same fact about each of a group of patients is ascertained before treatment is instituted. After treatment has been undertaken for a period sufficient to permit the attainment of a relatively stable equilibrium, the same fact is again measured in the same way. The arithmetic mean or average of these facts for the patients before treatment will probably differ from the mean or average of these facts for the same patients after treatment. In order to assess the value of the treatment, it is necessary to know whether or not this difference between the means or averages is significant; that is, whether it is the result of the treatment or due to mere chance.

The decision rests upon the following mathematical procedure: The averages or arithmetical means (M) of the two sets of facts are ascertained in the usual way. The standard deviations (sigma) from each of these means (M) are found by the use of a standard statistical formula. The values of these standard deviations are substituted into another recognized formula and by its use the standard error of the difference (D) between the means is obtained. Then the actual arithmetical difference between the averages (M) is found by subtraction. Statistical theory states that, if the arithmetical difference is more than three times the standard error of the difference, the results are significant; that is, there is a greater probability of their difference being due to the experimental factor or treatment than there is of their difference being due to chance. The exact probability is determined by dividing the standard error of the difference into the arithmetical difference and looking up in a table of probabilities that probability which corresponds to the resulting quotient (N).

The data presented in Table Ia exemplify this procedure. The facts ascertained quantitatively before and after treatment concerned frequency of attacks. The average frequency (M) before treatment is 2.15 per month and after treatment it is 0.64 per month. The standard deviations (sigma) of these means are, respectively, ± 0.79 and ± 0.72. The standard error of the difference (D), therefore, is 0.253. The arithmetical difference between the means or averages is 1.51. The quotient (N) of this quantity (1.51) divided by the standard error of the difference (0.253) is 5.8. The probability which corresponds to 5.8 in the table of probabilities is 1.16×10^{-5}%. This means that there are approximately 116 chances in 10,000,000 that the results of the experiment are due to chance.

The decrease in the severity of the headache after the initiation of treatment, as estimated by each patient in per cent, is purely subjective and must be so interpreted. It is included, however, as a matter of interest.

DISCUSSION

Opinions concerning the etiology of migraine are very diverse which probably signifies that the cause must be regarded as undetermined. Alpers[1] attempts to organize the various views by classifying the proposed causes of the disease as allergic, endocrinal, intestinal, or psychic.

Specifically, Brown[19] maintains that the condition of the gastrointestinal tract and the character of the diet are frequently exciting agents. He divides the attacks into those associated with the intake of more carbohydrate than can be conveniently utilized; those induced by the consumption of animal food, either in excessive amounts or of a kind likely to excite an allergic reaction in the individual; and those resulting from toxemias, probably caused by the histamine-like products of the intestinal putrefaction of proteins. The study of Brule and Pestel[20] on the relation between migraine and disorders of the gallbladder seems to support the chief contention of Brown and, likewise, to implicate the liver. In the same direction, the report of Tillim[21] that the induction of a hypoglycemic reaction affords relief to some patients is in accordance with Brown's first etiologic class and strengthens the contention that the liver is involved in these attacks.

The frequently expressed opinion[2] that the steroid hormones may be involved in one way or another with the migrainous attack, coupled with the work of Biskind and others[15,16] on the relation between these substances and liver function, further confirms the opinion that hepatic dysfunction may be involved in the fundamental causation of migraine.

The function of the liver in the detoxication of intestinal putrefactive toxins in the portal blood, in the metabolism of nitrogenous substances, and in the carbohydrate and steroid metabolisms certainly permits the speculative conclusion that the results reported in this paper are due to the corrective effects of methionine and the selected components of the vitamin B complex on disordered hepatic function. To take the position, however, that poor "liver function" is one of the etiological agents in migraine raises a question as to which function or functions of the liver are disordered in this condition.

If this problem yields to future investigation, the position of the well-known vasomotor effects[22] accompanying the attacks as etiological factors would still be unexplained. It is tempting to theorize that these vasomotor phenomena are the immediate causes of the attacks, while hepatic dysfunctions are among the remote etiological factors. If this were so, then a chemical or neural connection must be found between these agents. Perhaps a disordered liver allows the escape of histamine-like substance into the systemic blood through a failure of the detoxifying mechanisms[23] or by acting reflexly through the autonomic system excites vasodilation of the cerebral vasculature.[24] Such a theoretical proposition allows other agents to excite the vasomotor apparatus which would still remain the immediate cause of the attacks. The data presented do not permit the conclusion that faults in the hepatic metabolism are the only causes of migraine.

SUMMARY

Methionine and a vitamin mixture containing niacinamide, riboflavin, thiamin, and pyridoxine were administered to 31 females and 12 males having migraine headache. The medications were effective in reducing the number of attacks to a statistically significant degree in these patients. The role of the liver as a causative agent for the migraine attack is discussed.

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Photophthalmia

A Method of Treatment

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Photophthalmia is an acute inflammation of the cornea of the eye (keratitis) with an associated conjunctivitis as a result of short or prolonged exposure of the eye to the rays of ultraviolet light. The common causes of this condition are exposure of the eye to the "electric flash" of a shorted electric circuit (electric photophthalmia) or exposure of the naked eye to the welder's arc (industrial photophthalmia). Other causes, but less common, are prolonged exposure of the eye to the rays of the sun directly or indirectly through reflection from snow, large bodies of water, or large expanses of white sand (solar photophthalmia) and accidental exposure to the pure rays from an ultraviolet lamp (therapeutic photophthalmia).

The diagnosis of photophthalmia is based upon the history of exposure as referred to above and the symptoms of a "feeling of sand in the eyes," conjunctivitis, extreme photophobia, lacrimation, blepharospasm, pain, and edema of the eyelids. Most of the symptoms appear from 6 to 12 hours following the exposure.

The pathological effect of ultraviolet light is chiefly on the corneal epithelium because of the high absorption of the cornea for this type of light. The cornea is sensitive to ultraviolet light not only because of its absorption but because of the rich supply of nerve endings peculiar to the eye. When the cornea is exposed to a source of ultraviolet light of sufficient strength, an abiotic reaction begins after 6 or 8 hours with swelling and irregularity of the corneal epithelium. If the exposure is longer, the epithelium completely desquamates, the corneal corpuscles show fragmentation of their nuclei, and eosinophil cells appear in the cornea.[1] Tissue exposure of the superficial nerve terminals of the cornea is believed by authorities[2] to cause the pain and associated reflex symptoms. It is also claimed that the pain and associated symptoms will persist until there is complete regeneration of the corneal epithelium.

Because of the prompt, almost immediate relief of pain, photophobia, lacrimation, and other symptoms brought about by exposure of the cornea to the rays of the infrared lamp,[3,4] it is the opinion of the writer that the majority of patients suffering from photophthalmia have had comparatively mild exposures; that the pathology has not reached that stage in which the corneal epithelium has desquamated[5] (in order to determine whether or not corneal epithelium has desquamated following exposure to ultraviolet rays I administered fluorescein staining solution to the eyes of a number of patients); that the symptoms of pain, photophobia, and lacrimation result from pressure upon the superficial nerve terminals from edema of the cornea; and that the prompt therapeutic response obtained from the exposure of the cornea to the infrared rays is due to the clearing of this corneal edema.

METHOD OF TREATMENT[4]

A local anesthetic such as Pontocaine, 0.5 per cent, or butyn, 2 per cent, is instilled into each eye and the infrared lamp warmed up. When maximum heat from the lamp is obtained, the reflector is placed 30 inches from the patient's eyes. The patient is instructed to keep his eyes open and to look steadily at the dull red glow of the infrared light element for a period of 20 minutes. He is allowed to blink his eyes as often as he feels like doing so. The distance of the lamp from the eyes depends upon the amount of heat generated by the lamp and this may be adjusted accordingly. The heat of the skin about the face should be used as an indicator to judge the distance at which the lamp is placed and retained before the eyes.

Fifty-seven cases of photophthalmia have been treated by the above method in the past 5 years. As they are all very similar, only a few of the cases which illustrate the four types of ophthalmia mentioned above are reported.

CASE REPORTS

Case 1. E. L., aged 32, electrician. The patient suffered several flashes from a shorted electric circuit. The next morning he was unable to open his eyes. Later in the day when he appeared for treatment, he complained of a "feeling of sand in the eyes" and exhibited marked conjunctivitis, photophobia, lacrimation, and edema of the lids. Pontocaine was instilled and the patient placed under the infrared lamp for 20 minutes at a distance of 30 inches. Patient obtained immediate relief and return to work the same day. No supplementary treatment such as anesthetic ointment, cold compresses, or confinement to a dark room was prescribed.

Case 2. R. T., aged 50, physician. Inadvertently he exposed his eyes to the rays of an ultraviolet lamp while treating a patient. Eight hours later he awoke from sleep with a "feeling of sand in the eyes," extreme photophobia, and lacrimation. He was instructed to instill an anesthetic into his eyes and to use his bathroom (infrared) heater for 20 minutes at a distance based upon the intensity of the heat judged by the heat of the skin about the face. He telephoned me from his office the following afternoon that he had carried out my instructions fully, with the exception of the use of the local anesthetic as he had none to use, and that he obtained complete relief from all symptoms, except a vague feeling of dryness of the eyes and a mild injection of the bulbar conjunctivae.

Case 3. S. K., aged 43, millwright. The day before appearing for treatment the patient had exposed his eyes to a welding arc while assisting in the repair of a piece of machinery. Marked conjunctivitis, lacrimation, photophobia, and edema of the eyelids were present. Pontocaine was instilled into the eyes and the patient placed under the infrared lamp for 20 minutes at a distance of 30 inches. There was complete relief and the patient returned to work the same day.

Case 4. J. B., aged 45, policeman. Two days previously he had exposed his eyes to fierce sunlight while fishing and received a mild degree of burn. He was treated by his family physician who prescribed a local anesthetic, cold compresses, confinement to a dark room, and some tablets for pain. There were marked photophobia, a mild degree of conjunctivitis, and slight lacrimation. Pontocaine was instilled into

the eyes and the patient placed under the infrared lamp for 20 minutes at a distance of 30 inches. The photophobia was promptly relieved.

COMMENT

It is a well-known fact that large doses of infrared light rays may damage not only the cornea but also the lens and the retina.[6] Hence the physician in using infrared radiation about a patient's face should protect the eyes. However it is practically impossible, without causing pain, to apply heat through the closed lids to a degree endangering the cornea and other structures.[7] When infrared heat is used with the eyes open, there should never be an unpleasant hyperemia of the skin and the length of the treatment should not exceed 20 minutes. If such precautions are taken, infrared radiation will be found to be a safe and most rapid method for the alleviation of the symptoms of photophthalmia.[3,8]

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The Treatment of Coronary Thrombosis with Anticoagulants*

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A new approach to acute coronary thrombosis and myocardial infarction has been made possible by the application of anticoagulants. In 1940 Best[1] suggested that clinical cardiologists explore the possibilities of heparin in acute coronary thrombosis. Despite early encouraging results, however, this treatment was at first abandoned, primarily because of the technical difficulty of administering heparin in its aqueous form. Interest in the treatment of coronary occlusion with anticoagulants was revived by Nichol and Page,[2] Peters, Guyther and Brambel,[3] Wright,[4] and Parker and Barker[5] when dicumarol became available for clinical use, and by Loewe[6] who added Pitkin's mentruum to the use of heparin.

Before an attempt is made to discuss the use of anticoagulants in the management of acute coronary occlusion, certain factors of fundamental significance must be mentioned. Occlusion of a coronary artery may result from a variety of pathological processes. Some of the less common causes which are frequently overlooked are syphilitic involvement of the ostia, generalized obliterative vascular disease such as thromboangiitis obliterans, periarteritis nodosa and occasionally severe rheumatic carditis, subintimal hemorrhage, rupture of an atheromatous plaque and, rarely, embolism.

The most common cause of coronary occlusion is clotting of blood or thrombosis. Clotting usually occurs in a diseased vessel, frequently at the site of atheromatous degeneration. Collateral factors, some of which are fairly well established and others completely unknown, are important adjuncts. Such factors as the increased coagulability of the blood and the inordinate slowing of coronary blood flow are quite commonly accepted to be important contributing causes of coronary thrombosis. The subject of increased coagulability is of current interest. The study of blood coagulability by determination of prothrombin time on diluted plasma and in serial dilutions of heparin has shown that bed rest after an operation or illness increases the coagulability of the blood. It is possible that some individuals have an inherent tendency to hypercoagulability, although Peters, Guyther and Brambel[3] in their series found that an inherent tendency to clotting as measured by prothrombin time on diluted plasma was not a striking feature.

From these few brief statements it can be seen that coronary occlusion is not an independent disease entity but rather a product of pathologic processes involving a coronary artery. Therefore, it is apparent that even the most effective therapeutic procedure could not restore a severely arteriosclerotic vessel to its original anatomical and functional state. A successful partial recalibration of an obliterated or markedly narrowed vessel would represent a most gratifying therapeutic result.

In the past, and until quite recently, it was accepted by most cardiologists that nothing could be done in the way of treatment of the occlusion itself, and that the treatment of coronary occlusion consisted chiefly of rest, relief of pain, use of antispasmodics, and the treatment of such complications as occur. The use of anticoagulants, however, has completely reversed this attitude and it is now quite generally agreed that treatment can be directed to the occlusion.

In the years 1945 and 1946 encouraging reports following the use of dicumarol in the treatment of coronary thrombosis with myocardial infarction in man began to appear with increasing frequency. These reports were preliminary in nature since only small numbers of cases were studied. However, the uniformly favorable results appeared to justify a more extensive study of the use of anticoagulants in the treatment of coronary thrombosis. Accordingly, in the spring of 1946, the Board of Directors of the American Heart Association authorized the formation of the Committee for the Evaluation of Anticoagulants in the Treatment of Coronary Thrombosis With Myocardial Infarction. This committee was composed of internists with special interest in cardiovascular diseases, associated with the sixteen hospitals which contributed cases to this study. One thousand patients with coronary occlusion and myocardial infarction were studied and the report of the Committee was published by

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Wright, Marple, and Beck[7] in December, 1948. The plan of study was to compare two approximately equivalent groups of patients with acute cardiac infarcts, one treated by standard methods and the other with the same methods plus heparin and dicumarol. Patients admitted to the various participating hospitals on even days constituted the control group; those admitted on odd days constituted the group treated with anticoagulants.

On the basis of data compiled the following conclusions were made:

1. Patients treated with anticoagulant therapy in addition to the conventional forms of therapy experience a death rate and incidence of thromboembolic complications during the first six-week period following an attack which are markedly lower than those experienced by patients treated solely by conventional methods.

2. Anticoagulant therapy should be used in all cases of coronary thrombosis with myocardial infarction unless a definite contraindication exists.

3. In the absence of other hemorrhagic states, the hazards from hemorrhage due to anticoagulants are not sufficient to contraindicate their use in the treatment of coronary occlusion providing there are facilities for adequate laboratory and clinical control.

More recently Loewe and Eiber[8] concluded the following after treating 20 patients with coronary thrombosis with heparin and Pitkin's menstruum:

1. All the patients in the series were seriously ill; some were desperately ill. Fourteen of the patients (70 per cent) had clinically detectable complicating thromboembolic episodes. One of these complicated cases represented the only treatment failure (5 per cent) in the series of 20 patients.

2. In none of the 19 patients who recovered was there evidence of thrombus propagation once anticoagulation therapy was instituted. Furthermore, all complicating thromboembolic processes were promptly terminated.

3. In the optimally treated patients the time of bed rest was conspicuously reduced. Convalescence was accelerated and the patients were restored more rapidly to their usual activity.

4. The gratifying response of this small though representative series of gravely ill patients would seem to indicate that heparin with Pitkin's menstruum, because of its simplicity of administration, prompt effectiveness, and absence of toxicity, is well suited for the treatment of acute coronary artery thrombosis and its complications.

Justification for the use of anticoagulant compounds in treating patients with acute coronary occlusion and acute myocardial infarction depends upon acceptance of the following:

1. The chief cause of coronary occlusion and myocardial infarction must be intimately related to the process of thrombosis.

2. Thromboembolic complications, both cardiac and systemic, must play a significant part in morbidity and mortality.

3. Anticoagulant therapy must reduce or prevent the spread of the initiating thrombus and the development of intraventricular mural thrombi and systemic venous thrombi with their attending threat to embolism.

4. Treatment with anticoagulant compounds must be practicable without disproportionate risk.

Currently there are two preparations, namely, heparin and dicumarol, being used clinically in the treatment of acute coronary occlusion and acute myocardial infarction. Neither preparation possesses the qualities of an ideal anticoagulant. Both preparations require careful observation of the patient who receives them. However, sufficient clinical information has now accumulated to show that both preparations are effective in preventing thrombosis and that when they are used properly the risk of bleeding is very small.

HEPARIN

Heparin is prepared commercially from animal tissues, particularly liver, and is dispensed in ampules. It appears to have no toxic effects or significant physiologic effects other than its anticoagulant action. Heparin impairs coagulability of the blood, apparently by inhibiting both the conversion of prothrombin to thrombin and the coagulation of fibrinogen by thrombin and finally it prevents the formation of thromboplastin from platelets. The properties of heparin predicate the fact that a clot, regardless of its size or stage, cannot propagate in its presence. However, what happens to the clot that is already present is highly debatable. Loewe and others[9] studied the effect of heparin on experimental thrombosis and reported the following:

1. Unorganized red cell clots containing a minute amount of fibrin (sludge stage) disappear completely under heparin therapy.

2. Heparin therapy keeps patent adjacent collaterals and tributaries which usually would become involved in the thrombic occlusive process. The compensatory collaterals frequently become as large as the originally occluded vessel.

The sodium salt of heparin is now available in two forms, in aqueous solution and in delayed absorption mediums of which there are two types, Pitkin's menstruum[10] and a gelatin-dextrose medium. The aqueous form of heparin can be administered intravenously either continuously or intermittently, or intramuscularly at intermittent intervals. The delayed absorption mediums have greatly increased the use of heparin. As with most drugs it is impossible to recommend a given dosage of heparin which will be optimum for all cases. De Takats[11] has shown that the response of some patients to heparin differs from the average response. However, most patients will receive adequate therapeutic effects from the following dosages:

1. *Intermittent Intravenous Route.*—The recommended dose, in general, is 50 to 100 mg. of heparin every 4 to 6 hours intravenously.

2. *Continuous Intravenous Route.*—The continuous intravenous drip method is used only when clotting time must be greatly prolonged for a considerable period. Heparin, 100 to 200 mg., is added to 1 liter of 5 per cent glucose or normal saline solution. The rate of flow into the vein, usually 20 to 25 drops per minute, should be regulated according to the effect produced on the clotting time of the patient's blood. When heparin is given by this method it is desirable to determine the blood coagulation time every 12 hours.

3. *Intermittent Intramuscular Route.*—This route has as yet not been so widely used as those just described. According to Stats and Neuhof[12] adequate prolongation of the coagulation time is usually obtained by administering 1 mg. of heparin per pound of body weight initially and subsequently 0.5 to 0.7 mg. per pound of body weight every 8 hours.

4. *Delayed Absorption Heparin.*—It has been demonstrated that when heparin is given in either a gelatin vehicle or Pitkin's menstruum its effect is

markedly prolonged, thereby eliminating the annoyance of frequent injections. A dose of 400 mg. ordinarily produces a therapeutic anticoagulant effect for 48 hours; therefore, it is necessary in the average case to repeat the injection every second day. This type of heparin should be injected into the deep subcutaneous or superficial intramuscular tissues, preferably in the anterior or lateral aspect of the thigh.

For effective heparinization the blood coagulation time (Lee-White) should not be less than three times the normal for the patient, that is, 30 to 45 minutes. All coagulation time determinations should be estimated by the Lee-White method.

Because of its ease of administration and simple control, I have found this method of administering heparin to be the most suitable in cases of acute coronary occlusion and acute myocardial infarction. The only disadvantages have been pain at the site of injection and cost to the patient.

DICUMAROL

Dicumarol, originally isolated from spoiled sweet clover, is now made synthetically and usually dispensed in capsules, each containing 50 or 100 mg. It impairs coagulability of the blood by producing prothrombin deficiency as indicated by increase of prothrombin time and decreasing prothrombin content. The coagulation time of whole blood also may be altered but not proportionately to changes in prothrombin time or content. Determination of the coagulation time is not a reliable guide to the action of dicumarol. Dicumarol also may prolong clot retraction and increase the sedimentation rate of the erythrocytes. There is also some evidence that it inhibits adhesiveness of the thrombocytes. Other than these actions, dicumarol appears to have no effect on the human body.

Dicumarol is effective when administered orally. A satisfactory preparation for parenteral use has not been developed. Patients vary greatly in their sensitiveness to dicumarol; therefore, when it is administered a daily test of the prothrombin time and content is essential in order to be certain that an adequate but not excessive effect is being produced. It is advisable that the prothrombin time be expressed as the percentage of the normal prothrombin, because thromboplastins used in different hospitals may vary in potency. Also, thromboplastins prepared by the same technic may vary in potency from time to time. It is important that the prothrombin times which correspond to those for 10 per cent, 20 per cent and 30 per cent prothrombin be known each day. To this end when any particular thromboplastin is used, the prothrombin times for normal plasma and normal plasma diluted to 10 per cent, 20 per cent and 30 per cent with a 0.9 per cent solution of sodium chloride should be checked frequently. When dicumarol is being administered, it is advisable that the patient's prothrombin time be kept between the limits indicated by the value for 10 per cent and 30 per cent normal plasma which usually is between 30 to 35 seconds prothrombin time.

The dosage schedule for dicumarol which has been used successfully at the Mayo Clinic for several years is as follows: The entire amount for 1 day is given in a single dose. The first dose is 300 mg. On each subsequent day when the prothrombin is greater than 20 per cent of normal prothrombin, 200 mg. of dicumarol is given. On days when the prothrombin is less than 20 per cent of normal, no dicumarol is given. If the prothrombin drops below 10 per cent of normal during the first few days of treatment and remains there for 2 days, 20 to 30 mg. of menadione bisulfite is given intravenously, and thereafter only 100 mg. of dicumarol is given to that patient on those days on which the prothrombin is greater than 20 per cent of normal.

The disadvantages of dicumarol as an anticoagulant are that its effect is delayed for 1 or 2 days or longer after administration is begun and that the effect persists for 2 to 7 days after administration is discontinued. It is more difficult to stop its anticoagulant action than is the case with heparin.

CONTRAINDICATIONS

Obviously anticoagulant therapy is contraindicated in cases of purpura, in which there is a tendency for the patient to bleed. Anticoagulants are contraindicated in cases in which an operation recently has been performed on the brain or spinal cord. This is not because the risk of bleeding is greater but because the consequences of even minor bleeding at the operative site may be great. Dicumarol is contraindicated in cases of renal or hepatic insufficiency because the effect of the drug may be accentuated, greatly prolonged, and difficult to control. Dicumarol should be administered cautiously in cases of dietary deficiency although in these cases an excessive response can usually be controlled with synthetic vitamin K. Anticoagulants should also be given cautiously to patients who have ulcerative lesions, open wounds, and drainage tubes in place, since there is some increased risk of bleeding in these patients.

Personal experience with the anticoagulants in the treatment of acute coronary occlusion with myocardial infarction has been too limited to be statistically significant (16 cases). The information and data given above have formed the basis for using anticoagulants in coronary thrombosis. For the present, dicumarol and combined dicumarol-heparin have been completely abandoned because of variable response, failure to obtain satisfactory anticoagulation in the accepted range, and extension of thrombosis during adequate administration. Misleading plasma prothrombin determinations have been encountered during simultaneous heparin-dicumarol therapy.

Heparin in Pitkin's menstruum has proved to be the most satisfactory anticoagulant with me for the following reasons:

1. It interferes least with the rest of the patient since it need be given but every second day.

2. It is simply and reliably controlled by using the Lee-White method of coagulation time. This control is inexpensive and offsets the expense of the heparin in contrast to dicumarol which requires prothrombin estimations which are not only expensive but at times unreliable and even confusing.

3. It produces prompt anticoagulant response usually within 1 to 2 hours with no delay or lag as occurs with dicumarol.

4. It produces relief of precordial pain. To my knowledge this has not been reported by other investigators. Although heparin supposedly has no analgesic or vasodilator properties, I have repeatedly found that chest pain was considerably relieved shortly after its administration and completely relieved with no recurrence once the anticoagulant effect was obtained.

5. Heparin therapy can be interrupted promptly by an ice bag at the site of injection and if necessary by a small blood transfusion. Dicumarol is difficult

to interrupt and usually requires vitamin K and multiple blood transfusions.

6. Heparin, if need be, can be administered in the presence of liver and/or kidney disease while dicumarol cannot.

7. Complications of overdosage with heparin are none, so long as the cardiovascular system is intact. Overdosage with dicumarol results in serious hemorrhage despite an intact cardiovascular system.

8. Heparin with Pitkin's menstruum can be administered to the patient at home. Because of the ease of control, hospitalization is not absolutely necessary. This is a most valuable aid since the majority of patients cannot be transported soon after the occurrence of thrombosis.

While some of the foregoing statements are perhaps conjectural, they are based upon actual experience and are reported for investigation and discussion.

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Symptoms and Diagnosis of Herniated Intervertebral Disk*

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The patient with the classical syndrome of herniated intervertebral disk presents a history of injury, followed by intractable low-back pain which later radiates into the gluteal area and down the lateral or posterior aspect of the thigh into the calf or foot. It is often associated with sensory changes, weakness, and numbness in the affected leg. The pain is generally aggravated by coughing and sneezing. There is usually little or no response to conservative treatment. Many times a snap diagnosis can be made from the history but definite diagnosis should be made only after a careful complete physical examination.

Although several previous cases[1,2] had been reported, not until the report of Mixter and Barr[3] on 19 cases in 1934 was the syndrome brought to wide attention. Since that time the syndrome has been definitely established and has been widely investigated. Its proper place in the etiology of low-back pain has been established. It is not so common as many at first claimed yet it is common enough that the general practitioner and the orthopedic specialist must consider this possibility in diagnosing any case of low-back pain, especially when accompanied by radiation of the pain down one leg.

SYMPTOMS

History of Injury.—There is usually a definite history of injury to the low back. This may have been a single severe injury, or there may have been repeated minor injuries. The original injury may have been considered trivial at the time. Often there is a predisposing weakness of the lumbar spine or the lumbosacral junction due to congenital anomalies, poor posture, or osteopathic spinal lesions. Following the initial onset of pain, there is a history of repeated attacks of disabling pain in the low back with or without injury at each exacerbation. During the first few attacks the pain may be confined to the low back and later radiate down the course of one sciatic nerve; the original injury may be severe enough to cause immediate sciatic radiation.

There has been some discussion as to whether degenerative disk lesions without trauma might result in this syndrome. However, since 80 per cent of all disk cases occur in the age group of 20 to 50 years, it is logical to assume that the condition is chiefly traumatic in origin, because in this age group ligamentous structure is still good,[4,5] and these individuals are otherwise healthy.

Pain.—The chief presenting symptom and the chief incapacitating symptom is pain. The pain is described as sharp and is usually in the lumbosacral area. It is typical for the pain to radiate over one gluteal area and down the course of the sciatic nerve into the calf or heel. The pain is constant and is unresponsive to the usual sedation. At times there may be almost complete remissions, only to be followed by acute exacerbations, each of which is generally more acute than the previous one. The pain may occasionally radiate into the groin. The patient usually states that he has found that certain movements aggravate the pain severely. Bending forward and lifting usually intensify the pain most. Hyperextension movements of the spine may greatly increase the pain. The distribution of the pain does not correspond to the sensory dermatomes; at times it may be difficult for the patient to localize the pain.

Heat brings relief only temporarily or not at all. Rest does not relieve the pain, although most patients

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find they can get into a comfortable position to get some rest. Night pain is often severe. Standing may be much more comfortable than sitting or lying down; on the other hand pain may be most severe on standing. Anything which increases intraspinal pressure, such as coughing, sneezing, nose blowing, or straining at stool, aggravates the pain sharply. Following this aggravation the patient may assume an attitude of flexion of the affected extremity at the hip and knee with plantar flexion of the ankle, since he finds that this position relieves the pain. During an acute attack the pain may be so severe that satisfactory examination of the patient is impossible.

Numbness or Tingling in the Affected Leg.—This is not necessarily present but it is frequent for the patient to describe sensations of numbness, tingling, burning, prickling, and stinging in the leg. This symptom may be present in other conditions. There may be a complaint that the affected leg feels warmer or colder than the other leg, although objective findings do not usually corroborate this.

Weakness of the Leg and Back.—The patient often describes his back as weak. This may be due to the pain present or to the fact that he has discovered that use of the back intensifies the pain. In cases of long standing there is often atrophy of leg muscles and there may even be paralysis. The atrophy may be apparent to the examiner on inspection but it should always be checked by measuring the circumference of the legs at several levels. Muscular cramps are not uncommon. Rarely there may be sphincter disturbances.

This weakness of the leg and back constitutes one of the cardinal triad of symptoms described for this condition by Scuderi.[6] The other two are diminished Achilles reflex and areas of anesthesia.

Reflex Changes.—The Achilles reflex is often diminished or absent, usually in lesions at the lumbosacral level. Other reflexes are diminished only in pronounced lesions.

Sensory Changes.—There are usually definite areas of hypesthesia or anesthesia on the affected leg corresponding to the anatomical nerve-root patterns. These dermatomes have been plotted by several authors but tend to vary from patient to patient. The anesthetic areas can be plotted on the legs by the pin-prick method, comparing the two legs. The gluteal areas and sacral area should also be checked, since lumbosacral lesions may produce some saddle anesthesia. Sensation should also be checked with cotton wool (or brush) and with hot and cold test tubes. There may be a painful hypesthesia present, similar to causalgia. It is typical that the trophic nerves are unaffected, since the rami to the sympathetic trunk arise from higher levels than are usually affected by herniations of the nucleus pulposus.

Tenderness of Spinous Processes.—The spinous processes of the vertebrae above and below the ruptured disk are very tender to palpation and percussion.

Other Symptoms.—There is usually a severe spasm of the lumbar spinal muscles. The lumbar curve is usually flattened out. Scoliosis is present, usually with the convexity away from the side of pain and with the affected hip held higher. The spine tends to list forward and to one side. The weight is carried on the unaffected leg with a limping gait. The patient always moves with a guarded motion. He may have trouble standing on his toes or heels due to weakness of the Achilles group or anterior tibial muscles.

The straight leg-raising test can be carried out only for 20 to 30 degrees and is positive for pain in the low back. Murphey[5] says, "Pain in the affected hip or leg on straight leg-raising of the normal extremity is almost pathognomonic of a ruptured disc." The Lasègue test is positive on the affected side. The Kernig test is usually positive. Jugular compression test is positive; this is pathognomonic of intraspinal disease.

DIAGNOSIS

Diagnosis of a herniated nucleus pulposus is not so easy as many writers would have one believe. "The clinical syndrome of rupture of a lumbar intervertebral disc with pressure on one or more spinal root nerves or the cauda equina is quite similar to many conditions producing low back symptoms, and is often indistinguishable from myofascitis. There are no unique physical, neurological, or orthopedic signs which are found only in cases of posterior protrusion of the disc, and diagnosis is therefore usually very difficult."[4] Steindler[7] says that one must prove that a disk lesion exists, that it is responsible for the radiation of pain, and that it produces other objective, so-called neurological signs. The history and examination must be complete for an accurate diagnosis. If the diagnosis is obscure, the examination should be repeated. Diagnosis is based on the following:

Typical History of Case.—There is a typical history of recurrent attacks of low-back pain with sciatic radiation. It is intractable at the time, although previous attacks may have been responsive to conservative therapy. The etiology is usually traumatic.

Symptoms and Physical Findings.—The symptoms mentioned above form the basis of diagnosis. Localization of the lesion may be determined in some cases from the sensory findings. Woodhall[8] states, "The preoperative sensory patterns seen in instances of classical disc protrusion are dependent upon at least the two factors of varying compression and the well-recognized overlap of sensory dermatomes. . . . Roughly, half of the patients with indisputable disc protrusions show sensory changes that are of diagnostic and localizing value." Herniations at the fourth lumbar interspace affecting the fifth lumbar nerve root usually give anesthesia of the great toe, the dorsum of the foot, and the anterolateral aspect of the calf. Herniations at the lumbosacral level affecting the first sacral nerve root give anesthesia of the lateral three toes, the lateral aspect of the foot, and the lateral aspect of the thigh posteriorly over the buttocks. Certainly sensory findings can be suggestive of the level of lesion.

Some writers claim accurate localization from sensory findings alone but Love[9] says, "There is so much variation in the formation of the lumbosacral plexus and the lower part of the back that space-taking lesions cannot be localized consistently in this region by the neurological method." He points out that neurological findings may be absent or that they may be very marked. Weakness of the gastrocnemius group of muscles and diminution of the Achilles reflex may be suggestive of a lesion at the fourth interspace.

Laboratory Examination.—Few laboratory tests are of diagnostic value in this condition. Protein content of the spinal fluid is elevated in most cases to 40 mg. per cent or more; it may be as high as 100 mg. per cent and averages 60 mg. per cent. A finding of over 100 mg. per cent is indicative of neoplasm. The Kahn test, sedimentation rate, and complete spinal fluid examination will aid in differential diagnosis.

Spinal Tap and Manometric Findings.—Spinal tap may be performed at the same time as myelogra-

phy. Its value lies in complete examination of the spinal fluid. Manometric readings should be taken before spinal fluid is withdrawn. If a complete subarachnoid block is found, a neoplasm should be suspected. Partial subarachnoid block may be demonstrated by placing a blood pressure cuff around the neck and taking manometric readings at 0, 10, 20, 30, 40, and 50 mm. of mercury successively and then reversing the process. A slow rise and a slow fall in the manometric readings are not indicative of partial block, which may or may not be due to herniated intervertebral disk. As the pressure in the cuff is increased, there may be increased pain down the affected leg, giving a positive Queckenstedt test, indicative of intraspinal lesion.

Roentgenological Examination. — According to Love,[9] "All patients who have intractable low-back pain and sciatic pain and all patients with evidence of nerve-root involvement should have roentgenograms of the appropriate portion of the spinal column before surgical intervention is undertaken, no matter how obvious the diagnosis seems to be." X-rays are of little value in the diagnosis of posterior protrusions of the nucleus pulposus but they do rule out other lesions. They should include films as high as the eleventh dorsal level, since some roots of the sciatic come from as high as this level. In all suspected disk lesions, oblique films of the lumbar spine should be taken to rule out fractures of the lumbar arthrodial facets. There is often noted a straight lumbar spine but this is not diagnostic. Narrowing of the intervertebral-disk space and hypertrophic changes at the posterior margin of the disk space are not of real diagnostic value because these may be found also on patients who have no low-back pain. They are only suggestive of a lesion at this level.

Myelography.—After a diagnosis is made of herniated intervertebral disk, a myelogram will confirm the diagnosis and aid greatly in localization of the lesion. Preoperative myelography suggests additional areas to be explored and rules out or visualizes cord tumors. In a study by Camp[10] myelography was 92 per cent accurate in localizing the lesions. A negative myelogram does not necessarily rule out the diagnosis of herniated intervertebral disk but does indicate that the case needs rechecking. Myelography should not be performed without definite indication. It should be limited to the patient who is likely to come to surgery. If surgery is not anticipated, there is no need to subject the patient to this procedure.

There are several contrast media which can be used for myelography. Thorotrast gives good contrast but its radioactivity precludes its use. Air has the advantage of being rapidly absorbed and leaving no foreign material in the spinal canal; however, it provides poor contrast and often gives rise to severe cephalalgia. Lipiodol gives excellent contrast but is very difficult to remove; when not removed it tends to cause much arachnoid irritation. Pantopaque is now used most extensively. It is usually easy to aspirate, although it sometimes globulates. It provides good contrast, demonstrates small irregularities, and leaves minimal aftereffects.

The technic for myelography is briefly as follows: The patient should be hospitalized the day previous and routine laboratory examinations performed. Sedation is administered at bedtime. The patient is not given breakfast. Approximately ½ hour before the patient is to be taken to the x-ray department he is given sedation consisting of an appropriate dose of a narcotic plus scopolamine. The patient is placed prone on a motor-driven fluoroscope with a pillow under the anterior iliac crests and abdomen. A blood-pressure cuff is placed around the neck. The lumbar area is prepared and draped; sterile technic is used throughout the procedure. Local anesthesia is infiltrated into the area of the interspace between the third and fourth lumbar vertebrae or the interspace between the second and third may be used if pathology is suspected as high as the third interspace.

Spinal tap is performed with a 20 gauge spinal needle. The dura mater must be pierced in the midline. A manometer is attached to the needle and spinal fluid pressure taken. Then the pressure on the blood pressure cuff is increased successively in 10 mm. stages to 50 mm. of mercury and the manometric readings are taken at each stage. The pressure is then decreased in 10 mm. stages and manometric readings again taken. Spinal fluid (6-10 cc.) is withdrawn for laboratory examination. Pantopaque, 1 cc., is injected through the needle. The roentgenologist checks this under fluoroscopic examination to make sure it is mobile in the subarachnoid space. Then 2 cc. more are injected. The stilet is replaced in the needle and a sterile towel placed over it. The roentgenologist then proceeds with his examination.

By moving the table end up and down the oil is slowly run inferiorly towards the caudal sac, while the shadow is watched for any irregularities. Spot films are taken when the oil is passing the third, fourth, and fifth lumbar interspaces. The patient is then turned to the right and left oblique positions and fluoroscopic examination repeated. Films are again taken at several levels. The Pantopaque is pooled around the end of the needle and slowly withdrawn. If it is pooled properly and has not globulated, it should be possible to withdraw practically all of the oil. A film is then taken as a check on the amount of oil yet remaining in the subarachnoid space.

The films are then examined and the appearance of the opaque column evaluated. Variations from normal may be as follows: (1) Midline defect due to rupture of annulus fibrosus with posterior protrusion of the disk, (2) asymmetry of the caudal end of the subarachnoid space, (3) narrowed subarachnoid space defect, (4) posterolateral defects, (5) obstruction due to tumors, (6) extra-arachnoid injection. A herniated intervertebral disk produces a characteristic concavity on the anterior or anterolateral surface of the oil column in oblique films and this corresponds to the level of the intervertebral space. If the defect is posterior, the diagnosis of hypertrophied ligamentum flavum must be considered strongly.

DIFFERENTIAL DIAGNOSIS

Posterior herniation of a lumbar intervertebral disk must be differentiated from a number of other conditions. Among these are:

1. Myofascitis or myofibrositis: There are generally no sensory findings and seldom any sciatic radiation.

2. Acute back strains: These respond to conservative treatment.

3. Postural defects: These can be distinguished by postural examination and x-rays.

4. Vertebral fractures: These can be differentiated by x-ray. Oblique x-rays are essential to rule out arthrodial fractures.

5. Infectious processes: These can generally be distinguished by x-rays and the general physical examination.

6. Ankylosing arthritis (Marie-Strümpell type): Often this is almost indistinguishable, even with x-rays, since nerve-root pain may occur from the arthritic changes.

7. Spondylolisthesis and spondylolysis: These can be differentiated by x-rays, although herniation of the disk may accompany the condition.

8. Neoplasms of the spine: Differential diagnosis is made by x-rays and general physical examination.

9. Neoplasms of the spinal cord or nerve roots: There is often a complete subarachnoid block. The sensory and motor lesions are more complete. Usually the pain of spinal cord tumors is made worse by rest in bed, while disk-lesion pain is made worse by activity.

10. Neoplasms of the peripheral nerves: Careful examination of the course of the nerve should reveal these.

11. Hypertrophy of ligamentum flavum: This usually causes a lateral or bilateral constriction of the contrast media at the interlaminal space, while disk lesions cause anterior defects at the intervertebral space between the bodies.

12. Disease of rectum, prostate, pelvic viscera: Thorough examination should reveal lesions of these organs.

13. Other conditions which must be borne in mind before a final diagnosis is made include syphilis, subdural abscess, arachnoiditis, injury to sciatic nerve, narrowed intervertebral foramina, herpes zoster, injections of foreign material into the gluteal area, aneurysm of either the iliac or popliteal artery, vascular disease, and polyneuritis.

CONCLUSIONS

The symptoms of herniated intervertebral disk are, briefly: low-back pain following injury with radiation of the pain down the posterior aspect of one leg, neurological changes in the affected extremity, tenderness of the lumbar spine, positive orthopedic signs indicating lumbosacral joint and sciatic nerve involvement.

Diagnosis is difficult and can be made only after a thorough and complete history of the case has been obtained and physical examination performed.

Spinal tap and myelography are essential aids in diagnosis.

The syndrome must be differentiated from a number of other conditions by physical, roentgenological, and laboratory examinations.

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ANGINAL PAINS

"The attack is very short, and like a storm. It usually ends within an hour. . . . To have any other malady is to be sick, to have this is to be dying."

Lucius Annaeus Seneca, Roman Stoic philosopher, wrote these lines in the First Century to describe the symptoms of his own disease. They are the earlier known description of anginal pains of coronary insufficiency.

The heart muscle and the brain need and use far more oxygen to function than other tissues in the human body. Deprived of that oxygen even briefly, these specialized tissues deteriorate quickly. Anginal pains are the heart's signals that its flow of nourishment is being diminished.—N. S. Haseltine, *The Human Heart*, Federal Security Agency, Washington, 1950.

The Osteopathic Lesion Syndrome*

IX. Some Effects of the Osteopathic Vertebral Lesion in Striated Musculature and Associated Structures†

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INTRODUCTION

Previous reports have indicated that there is an alteration in the striated musculature which is segmentally related to the experimental osteopathic vertebral lesion.[1-4] Alterations have been noted clinically as rigidity of the paravertebral musculature and tenderness of the skin over the lesioned segments.[5] These observations would suggest that there may be variations in the paravertebral musculature in the spinal segments related to an osteopathic vertebral lesion as compared to nonlesioned segments, and that these variations may be demonstrable by histological methods. It seemed desirable to attempt an evaluation by such methods of the status of these muscle groups and their associated structures, such as the motor end plates and the vasculature. The following report presents the results.

MATERIALS AND METHODS

1. *Materials.*—Six experimental rabbits and 2 controls were used. The animals in this experiment were litter mates and maintained under identical environmental conditions previous to and during the experiment.

An ordinary compound microscope and phase contrast accessories‡ were used in the observations of the tissues. Any attempt to demonstrate alterations of cells and organs by microscopy is hampered by the limitations of the compound microscope to demonstrate living cells; therefore, fixed stained sections are often used with attendant artefact formation. By the use of the phase contrast accessories, however, it is possible to observe certain cytological structures without the introduction of fixatives or stains into the tissues.

It must not be assumed that the tissues are in an unaltered state, because the instant tissues are removed from the body irreversible alterations occur that prevent comparisons with tissues in situ. The usefulness of phase contrast microscopy lies in the fact that it is possible to observe the physical condition and characteristics of the tissues without the use of fixatives.

The main difficulty in observation of any histochemical reaction arises from the fact that the different parts of the living cell generally do not absorb visible light even though differences in the index of refraction of the various structures of the cell (sarcomere) may be sufficient to produce phasic changes. This limitation of the ordinary compound microscope has also been, in part, overcome by the use of phase contrast accessories.

Ordinary photomicrographic methods were used to make recordings of the fresh muscle preparations. A Gamma photomicrographic camera§ and a Zirconarc‖ photomicrographic lamp gave the best photographic results with panchromatic X Eastman Kodak film.

2. *Methods.*—The lesioning of the animals was done by the method of Burns[6] which consisted of the application of pressure and rotation of the vertebrae in a plane of physiological motion. The lesioning maneuver was first made when the rabbits were 6 weeks old and was repeated a maximum of three times within the first 6 days of the experiment. It has been demonstrated that it is not necessary to repeat the lesioning process following the establishment of the experimental lesion.[2] The animals were maintained without further manipulation for 6 weeks and then killed by an injection of 5 cc. of pentobarbital sodium.

The paravertebral musculature of 3 animals was injected with 5 cc. of Varisol¶ at the same segmental level at which the osteopathic vertebral lesion was created. The animals were maintained under environmental conditions similar to those of the other two groups and were killed at the end of 6 weeks by the same method.

At autopsy the paravertebral musculature of the rabbits was exposed and small sections of the superficial and deep muscle groups of the experimental and control regions were removed. Some fibers were examined and photographed by phase contrast methods and the rest fixed in Bouin's fixative for examination by routine histological methods.[7,8] The tissues were removed from the fixative, washed, dehydrated, and imbedded in paraffin; some were sectioned by the freezing method. Gallocyanin[7] and hematoxylin were used as the nuclear stains and phyloxin and eosin (bluish) were used as the cytoplasmic stains.

Phase contrast observations were made using bright, B minus, and dark medium contrast objectives. The use of such objectives allows a more complete examination of tissues because each type of phase contrast demonstrates certain histological characteristics to the best advantage.[9,10]

Ninhydrin (triketohydrindenhydrate)# was used to ascertain if there were alterations in the protein components of the muscle of the lesioned segments in comparison to those of the control segments. It has been stated that the less soluble peptides and proteins containing the alpha-amino acids may be demonstrated at their loci in tissue sections by either alloxan or ninhydrin.[11] The ninhydrin reaction of Berg[12] is

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†This is the ninth report in a series in which the first seven parts were published with the title, "The Osteopathic Lesion Complex." Seven parts were published in the November, 1947; April, 1948; September, 1948; February, 1949; April, 1949; November, 1949; and May, 1950, issues of THE JOURNAL. An eighth part was published in the July, 1948, *Journal of Osteopathy*.

‡Phase contrast accessories used in this experiment were obtained from the Bausch and Lomb Optical Co., Rochester, N. Y., and the American Optical Co., Los Angeles.

§Gamma photomicrographic camera was obtained from the Gamma Instrument Co., New York.

‖Zirconarc photomicroscopic lamp was obtained from the Fish-Schurman Co., New York.

¶Varisol, which was obtained from the Abbott Laboratories, North Chicago, Ill., contains invert sugar, 30 per cent; sodium chloride, 10 per cent; and benzyl carbinol, 1 per cent.

#Ninhydrin was obtained from the Eastman Kodak Co., Rochester, N. Y.

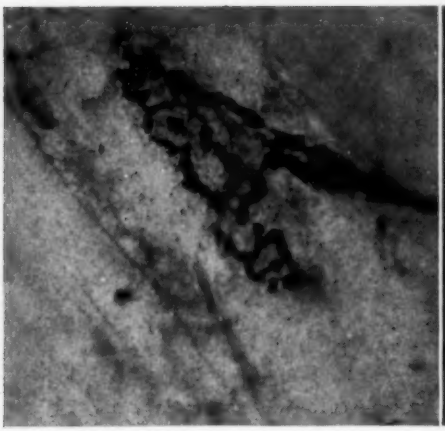


Fig. 1

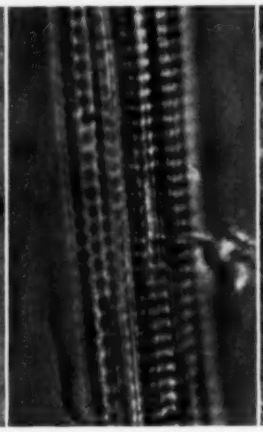


Fig. 2

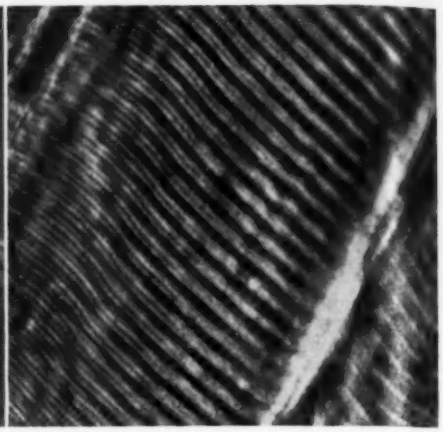


Fig. 3

Fig. 1. Motor end plate, × 450. Gold chloride stain. Control motor end plate on resting muscle. Usual shape on side view. Motor nerve has a slight enlargement before splitting into terminal branches. Muscle fiber does not always exhibit striations by this staining method. Enlargement less than Figures 12 and 13; size comparisons cannot be made. Fig. 2. Individually teased muscle strands, probably several myofibrillae, × 450 and enlarged. Control section. Fresh teased preparation stained in ninhydrin for 2 days. Dark medium phase contrast accessories. The detail of the cross striations is preserved even in the smaller units of the muscle fiber. Fig. 3. Striated muscle fiber, × 450 and enlarged. Fresh teased preparation. Control section. B minus medium phase contrast accessories. Histological characteristics of the sarcomeres can be seen but the nuclei are not demonstrated.

recommended, but even with this reaction caution is necessary[13] as a positive reaction is obtained with many aminos, aldehydes, and ammonium compounds, as well as with the amino acids. However, the easy solubility of the aldehydes as a rule permits their ready removal if a weak solution of the stain is used as in this experiment.

The original technic used fixed tissue (in 10 per cent formalin) stained by boiling in a 0.2 per cent solution of ninhydrin for 60 seconds. It was ascertained in this experiment that this technic was not particularly useful because boiling produced a heavy staining reaction in a short time and eliminated the fine qualitative gradations of the reaction necessary for comparisons of the experimental sections to the control sections. Furthermore, the technic as originally described used fixed tissue which introduced more artefact formation by virtue of the denaturing process. The breakdown products[14] of the formalin (formic acid) probably would not contribute to the acid reaction due to the chemical nature of the acids.

The following modification of the original technic was devised and found useful in this experiment. Fresh muscle fibers were placed in a 1.0 per cent aqueous solution of ninhydrin and stained at 25 C. for 5 days. Examinations of the tissues were made at intervals of 1 hour, 2 hours, 10 hours, 18 hours, 2 days, and 5 days. The microscopic examination was made by removing small pieces of the muscle and teasing the fibers apart in a drop of the staining solution, covering with a cover slip, and examining by use of the phase contrast objectives. It was necessary to make photographs when permanent records were desired as the sections dry rapidly. After examination the muscle was discarded.

The motor end plates in the deep and superficial musculature of the control and lesioned segments were stained by the gold chloride method.[15]

The vasculature in fresh and stained muscles was examined by the phase contrast objectives without special preparation.

EXPERIMENTAL RESULTS

1. *General Observations.*—Following the production of the experimental osteopathic vertebral lesion the muscle mass of the lesioned segments was rigid and apparently tender, as the rabbits attempted to avoid palpation on examination. This reaction was more apparent on the side toward which the vertebra was rotated in the lesioning process but was present on the opposite side as well. The rigidity was not localized in the segment in which the attempt was made to produce the lesion but extended one or two segments above and below. This was probably due, in part, to the nonspecificity of the lesioning process. The rigidity persisted following the final lesioning process and in 2 cases following the second. No further manipulations were applied to the lesioned segments except palpation which was done bi-weekly.

The average weight of the experimental animals at the completion of the experiment was 1 pound less than that of the controls. Small samples were used in this experiment and the observations must be considered indicative rather than conclusive.

Grossly as compared to the controls the experimental animals exhibited no untoward symptoms after the lesion was created. During the lesioning process the animals attempted to avoid palpation, and after the experimental osteopathic vertebral lesion had been established there were slight differences between the experimental and control groups. The cardiac rhythm of the experimental animals was altered to the extent that it was noticeable by palpation, the heart beats were softer and the rate was increased, the ears were slightly congested, and there was slight exophthalmos.

2. *Autopsy Examination.*—

a. Control Group: At autopsy the paravertebral musculature of the control rabbits exhibited nothing remarkable. The tissues were not congested nor were there any evidences of vascular alteration in either the superficial or deep musculature.

b. Experimental Group (Varisol): The paravertebral musculature was reddened both in the superficial and deep layers and, in one animal, it seemed

Fig. 4

Fig. 5

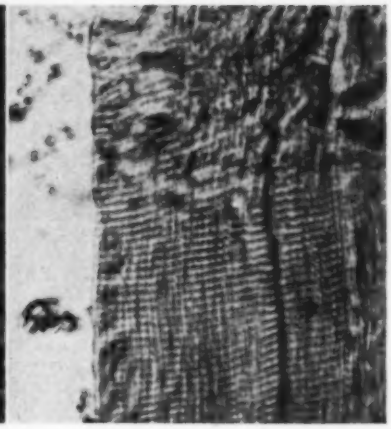


Fig. 6

Fig. 4. Striated muscle fiber, × 450 and enlarged. Fresh teased preparation. Control section. Dark medium phase contrast accessories. Detail of the anisotropic and isotropic disks may be seen. Clear line of demarcation between the muscle fibers. Fig. 5. Striated muscle fiber, × 450 and enlarged. Fresh teased preparation. Control section. B minus phase contrast accessories. Blood vessel between the muscle fibers contains blood cells. Fig. 6. Striated muscle fiber, × 450 and enlarged. Fresh teased section from control animal. Stained in ninhydrin for 1 hour. B minus medium phase contrast accessories. Cross striations can be seen but the myofibrillae (longitudinal striations) are very faint.

to be swollen. There was no evidence of edema, grossly. The redness of the musculature was present several segments above and below the site of injection, but not bilaterally.

c. Experimental Group (Experimental Osteopathic Vertebral Lesion): Redness was present in the deep spinal musculature and, to a much lesser degree, in the superficial musculature. The redness was not localized in the segment in which the attempt to produce the lesion was made, but was present almost to the same degree in the segments both above and below and was bilateral.

There were several extravasations of blood into the superficial tissues and the superficial blood vessels seemed to be somewhat congested in comparison to those of the control group.

3. *Microscopic Examination.*—

a. Control Group:

(1) Fixed and stained sections: The tissues following preparation by the freezing and paraffin methods appeared similar and will be described together. No abnormalities were noted in these sections. The nuclei of the muscle fibers stained well and the cross striations were normal although stained faintly. The edges of the muscle fibers were parallel and straight.

The motor end plate located on the surface of the control musculature exhibited normal morphological characteristics.[16] The motor nerve terminated in an elongated net-like structure (plasmodesma). Between the filaments of the net there was finely divided granular material (Kühne's granules). The motor end plate seemed to rest on the surface of the muscle fiber to which it adhered closely (Fig. 1).

The blood vessels coursed between the muscle fibers and contained blood cells but were not congested.

(2) Phase contrast observation of fresh unstained sections: Phase contrast methods demonstrated the detail of the cross striations to the extent that comparisons could be made between the control and the experimental preparations. Heavy dark lines, or telophragma (Z line), limited the sarcomere and were observed bisecting the anisotropic disk. Similar observations made at much greater magnification by the use of the electron microscope have been reported; however, the sections were photographed after fixation.[17] The morphological characteristics of the muscle fiber were similar to those demonstrated in the present experiment (Fig. 2).

Nuclei of the muscle fibers were not demonstrated by phase contrast methods because the focus was such that the striations were accentuated with a loss in the nuclear detail (Figs. 3 and 4).

No differentiation of the motor end plate from the sarcomere was noted in this experiment. The nerve was seen in some sections but a clear differentiation of the ending was not made.

The vascular pattern was demonstrated by phase contrast observation (B minus medium). The capillaries coursed beside the muscle fibers and then crossed and anastomosed with those on the opposite side. There were no blood cells noted outside of the capillaries (Fig. 5).

(3) Phase contrast observation of unfixed stained sections: At the end of 1 hour of staining with ninhydrin there was a bluish color in the staining solution and in the muscle fibers. (The freshly prepared solution of 1.0 per cent ninhydrin is straw colored and remains constant, at least for 2 months.) The histological characteristics of the muscle fibers were similar to those of the fresh unstained preparation (Fig. 6). At the end of 18 hours there was a differentiation between the individual myofibrils (longitudinal striations) as well as the cross striations (Fig. 7). At the end of 5 days the individual myofibrils were fairly well differentiated, together with the cross striations (Figs. 8 and 9).

The color of the staining solution became progressively deeper for 3 days and then gradually faded to the original straw color. The reaction was the same in all cases. The color of the muscle fibers became increasingly darker blue until the experiment was terminated at the end of 5 days.

The nerve supply to the muscle was demonstrated more clearly in stained preparations than in unstained. In several sections the ending of the nerve was ob-

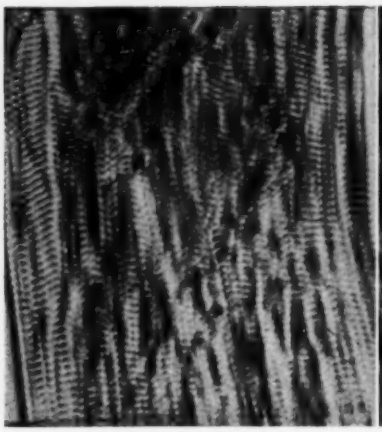


Fig. 7

Fig. 8

Fig. 9

Fig. 7. Striated muscle fiber, × 450 and enlarged. Control section. Fresh teased section stained in ninhydrin for 2 hours. B minus phase contrast objective. Cross striations may be seen and the myofibrillae are more apparent than in Figure 6. Fig. 8. Striated muscle fiber, × 450 and enlarged. Control section. Fresh teased section stained in ninhydrin for 2 days. Dark medium phase contrast objectives. Both the cross and longitudinal striations show clearly. Fig. 9. Striated muscle fiber, × 450 and enlarged. Control section. Fresh teased preparation stained with ninhydrin for 5 days. B minus medium phase contrast objectives. Note the clearness of the longitudinal striations (myofibrillae); cross striations can still be observed clearly.

served and the structure resembled that previously described by Boeke.[18] These characteristics are not similar to those of the motor end plate as demonstrated by the gold chloride staining method. No conclusions were made concerning the shape or morphological characteristics of the motor end plates in these sections but the observations indicate that further investigation is required (Fig. 10).

The staining reaction did not enhance the differentiation of the vascular supply.

b. Experimental Group (Varisol):

(1) Fixed and stained sections: The muscle fibers were wider than those of the controls. There was some difficulty in obtaining suitable differentiation of the cross striations in most of the sections and there was a minor degree of fibroblastic proliferation present. The nuclei of the muscle fibers was hyperchromic. The blood vessels were filled with blood and seemed to be constricted.

(2) Phase contrast observation of fresh unstained sections: In many preparations there was a dark appearing material that resembled fibroblastic proliferation. Otherwise the sections appeared similar to the control sections. The cross striations were obliterated by the fibroblastic proliferation (Fig. 11).

There was a vascular alteration to the extent that the blood vessels were filled with blood and there were blood cells outside of the capillaries. There were no extravasations of blood cells noted between the muscle fibers.

Fig. 10. Striated muscle fiber and nerve fiber, × 450 and enlarged. Control section. Fresh teased preparation stained for 18 hours in ninhydrin. Nerve can be seen crossing the muscle fiber with many knob-like endings. The cross and longitudinal striations of the muscle fibers can be seen. Fig. 11. Striated muscle fiber, × 450 and enlarged. Fresh teased preparation. B minus medium phase contrast accessories. Muscle fibers had received an injection of 5 cc. of Varisol solution 6 weeks previously. Note the disturbance in the normal cross striations. Fig. 12. Motor end plate, × 450. Gold chloride stain. Motor end plate resting on muscle fibers in an area of osteopathic lesion. Increased granular precipitation in the meshes of the nerve net and on the muscle fiber.

Fig. 10

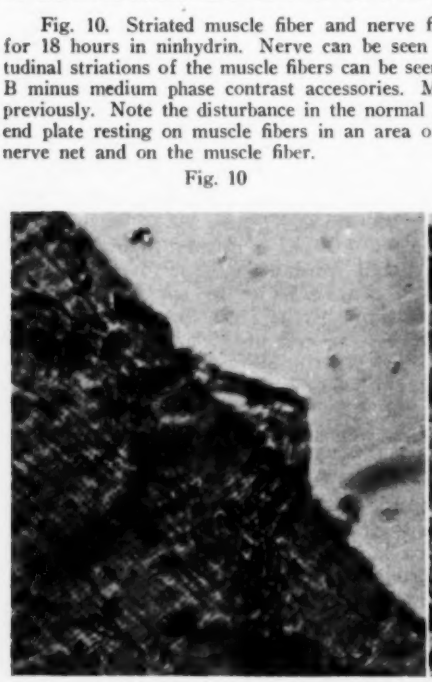


Fig. 11

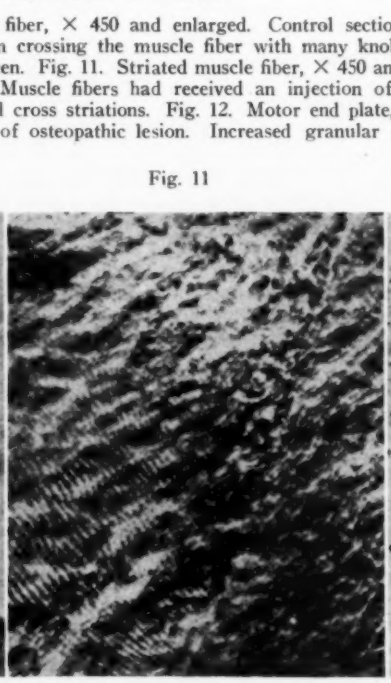
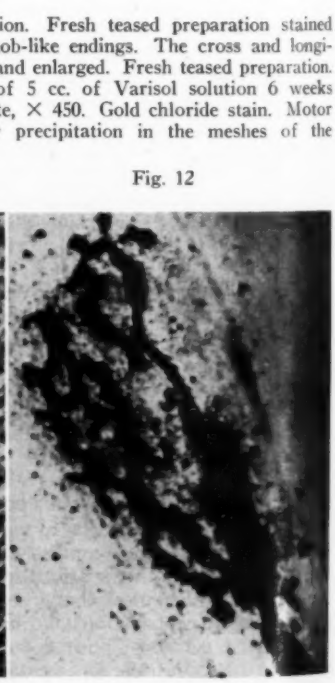


Fig. 12



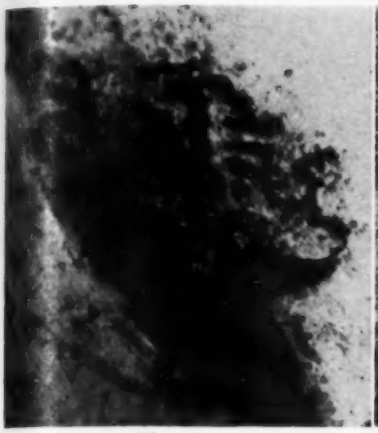


Fig. 13

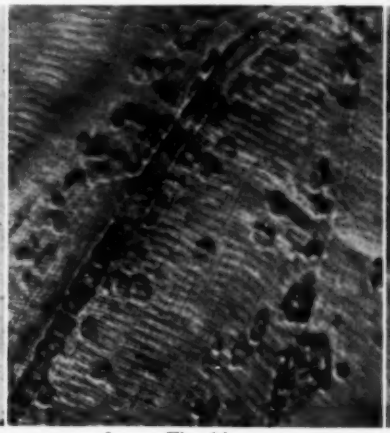


Fig. 14

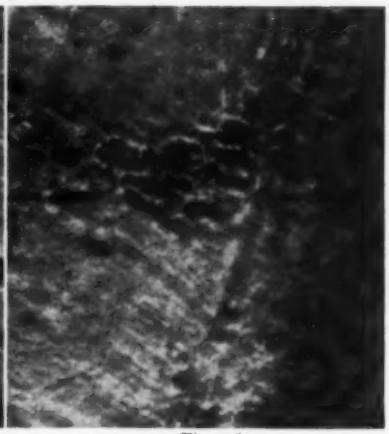


Fig. 15

Fig. 13. Motor end plate, × 450 and enlarged. Gold chloride stain. Motor end plate resting on the muscle fibers in an area containing an experimental osteopathic vertebral lesion. Precipitation of granular substance in the meshes of the motor end plate and on the surface of the muscle fiber. Fig. 14. Vascular supply to striated muscle, × 450 and enlarged. Fresh teased muscle preparation. B minus medium contrast phase contrast accessories. Blood vessel between the muscle fibers filled with blood cells. Blood cells also on the surface of the muscle fibers. Compare with Figure 5. Fig. 15. Vascular supply to striated muscle, × 450 and enlarged. Fresh teased muscle preparation. B minus phase contrast accessories. Capillary crossing muscle fiber filled with blood. Extravasation of blood cells located between the muscle fibers at the right of the photomicrograph. Tissue removed from an area containing an experimental osteopathic vertebral lesion for 6 weeks.

(3) Phase contrast observation of unfixed stained preparations: The observations made of these preparations were similar to those of the control sections, except that the definition of the myofibrils was not as apparent. The progress of the staining reaction was similar. The appearance of the fibroblastic proliferation was not altered.

c. Experimental Group (Experimental Osteopathic Vertebral Lesion):

(1) Fixed and stained sections: The microscopic appearance of the muscle fibers was similar to those previously reported.[19] The cross striations, faintly staining in the control sections, were not demonstrated. The nuclei of the muscle cells stained well and seemed normal except that the staining reaction was hyperchromic. The edges of the muscle fibers were parallel but not straight. In some sections, particularly of the deep spinal muscles, there were condensations of the sarcoplasm and the muscle fibers seemed to be slightly wider. As measurements by an ocular micrometer were not made, no definite conclusions may be attempted.

The motor end plate, as demonstrated by the gold chloride method, was much darker and the Kühne granules stained much more heavily. In some instances the heavy staining of the granules obliterated the plasmodesma. There was no indication of the wide variation in the size of the motor end plates that has previously been reported[20] but which has also been denied[20,21] (Figs. 12 and 13).

The vascular pattern was somewhat altered bilaterally, more apparently in the deeper musculature than in the superficial groups of the lesioned segments. Congestion of the blood vessels was present and in

Fig. 16. Striated muscle fiber, × 160 and enlarged. Fibers removed from an area with an experimental osteopathic vertebral lesion. Fresh teased preparation. Variation in size and heavy cross striations of one muscle fiber (contracture). Compare with Figures 3 and 4. Fig. 17. Striated muscle fiber, × 450 and enlarged. Fresh teased preparation removed from an area containing an experimental osteopathic vertebral lesion. Fig. 18. Striated muscle fiber, × 450 and enlarged. Fresh teased muscle fiber removed from an area of experimental osteopathic vertebral lesion and stained with ninhydrin for 2 hours. Cross striations plainly seen but little differentiation of the longitudinal striations.

Fig. 16

Fig. 17

Fig. 18

Fig. 19

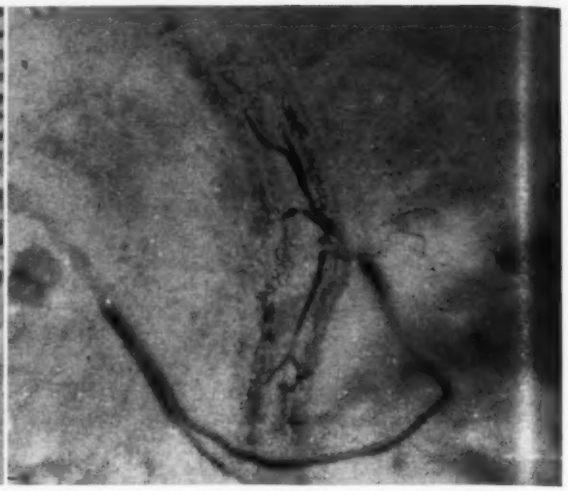


Fig. 20

Fig. 19. Striated muscle fiber, × 450 and enlarged. Fresh teased muscle fiber removed from an area of experimental osteopathic vertebral lesion and stained with ninhydrin for 5 days. B minus medium phase contrast accessories. Definite cross striations but the longitudinal striations not clearly demonstrated. Compare with Figure 9. Fig. 20. Neurotendinous ending, × 450 and enlarged. Gold chloride stain. Removed with the control musculature and stained.

some cases extravasations of blood cells into the perivascular region; the latter condition was not marked (Figs. 14 and 15).

(2) Phase contrast observation of fresh unstained preparations: There were no alterations of any significance observed in the superficial muscle masses. In the deeper musculature, particularly those muscle groups between the spinous and the transverse processes of the vertebrae, there were areas in the muscle fibers in which the striations were much thickened and heavier than those of the control sections. These were not observed in all of the sections removed from the lesioned segment. The muscle fibers adjacent to the contracted fibers could not be differentiated from those of the controls (Figs. 16 and 17).

No observations were made on the motor end plates. The blood vessels between the muscle fibers were filled with blood and in many sections there were blood cells in the tissue spaces and on the surface of the muscle fibers.

(3) Phase contrast observation on unfixed stained preparations: Gross observation of the staining solution of ninhydrin containing the muscle from the lesioned segments indicated that it was different from the solution containing the muscle from the control segments. With the former the color reaction of the staining solution observed with the latter was not present; instead the solution assumed a bluish discoloration for 36 hours and then faded rapidly to straw color. The muscle fibers from the lesioned segments did not take on the blue color noted in the control sections.

Observations of the musculature by phase contrast microscopy revealed that the ninhydrin did not differentiate the myofibrils. Cross striations were observed; they remained unaltered except in those cases in which the heavy thickened striations were present (Figs. 18 and 19).

Observations of motor end plates were not made by this method. The vascular pattern was altered to the extent of extravasations of blood into the tissue spaces and extreme vasocongestion (Fig. 15).

4. *Conclusions of the Experiment.*—The use of the various types of phase contrast objectives permitted a more accurate histological examination of the tissues because there was less artefact formation, which was due to the fact that the tissues were examined in as fresh a state as the technic would permit.

The staining reaction between the ninhydrin and the nitrogenous substances demonstrated the myofibril arrangement of the muscle fibers in the control musculature, but failed to produce the same differentiation in the musculature removed from the segments affected by the experimental osteopathic vertebral lesion. This would indicate that there was an alteration (reduction) of the available protein material in the musculature associated with the experimental osteopathic lesion.

Examination of the fixed stained sections indicated that there was a variation in the staining reaction of the musculature removed from the controls and that removed from the segment containing the experimental osteopathic vertebral lesion. The reaction in the experimental sections was similar to that described as Zenker's hyaline degeneration, but it was not marked. From this observation it was concluded that the experimental osteopathic vertebral lesion influences the functional capacity of the muscular tissue. The histological characteristics of the tissue indicated that there was the beginning of a degenerative change. Contracture was present.

The injection of a sclerosing solution (Varisol) into the muscle tissues resulted in a similar reaction, but to a lesser degree. The histological characteristics of the musculature removed from the area containing the experimental osteopathic vertebral lesion were not similar to those receiving the injection of Varisol. It was impossible to compare the two reactions insofar as local response was concerned.

Fibroblastic proliferation and vascular changes were seen in the musculature containing the Varisol. There were no similarities between these muscle groups and the groups removed from the osteopathic lesion except vascular alteration, which occurs as the

result of irritation no matter what the cause may be. Varisol is a chemical irritant and the production of an experimental osteopathic lesion is a physiological irritant. That the irritation emanating from either source would probably result in similar visceral disturbances cannot be denied but it was concluded that a direct comparison of the two situations in the vertebral area was not possible.

The motor end plates resting on the muscle fibers associated with an experimental osteopathic vertebral lesion exhibit morphological changes, probably due to alteration of the staining reaction, probably caused by alteration in the chemical balance of the musculature. Size comparisons were not made by an ocular micrometer, but there was no apparent variation in the size of the motor end plates located on the control muscle fibers and those resting on the muscle fibers removed from an area of experimental osteopathic vertebral lesion.

DISCUSSION

1. *Introduction.*—It has been assumed by osteopathic physicians that some alteration occurs in the paravertebral musculature associated with an osteopathic vertebral lesion. Whether the primary etiological factor is structural imbalance or visceral pathology seems immaterial because the disturbance results in a nerve irritation that in turn produces a vascular and cellular response. When the irritation has become established the alteration in the paravertebral musculature is sufficient to maintain itself.

In this experiment the attempt was made to ascertain if the experimental osteopathic vertebral lesion contained muscle fibers that were in an altered state, as has always been assumed, and if such alteration could be demonstrated by histological methods and phase contrast microscopy. That the physiology of the musculature associated to a lesioned segment is altered has been demonstrated by Denslow and Clough,[23] and it seemed reasonable to believe that the alteration in functional activity could be demonstrated by histological methods.

The cytoplasm of cells plays a dominant role in exhibiting the special qualities of cellular activity, and such differentiation is considered to reach a high peak in the sarcomere. The submicroscopic examination indicates that the muscle fiber is composed essentially of protein fibrillae[24] and as such should react to substances that affect protein material in general; for this reason ninhydrin was used as a stain (Fig. 2).

It has been estimated that the myosins, or muscle proteins, constitute from 50 to 70 per cent of the muscle fiber,[25,26] and that actin, which is part of the myosin, has the peculiar property of undergoing reversible changes from the globular to the fibrous state. Globular-fibrous transformation is due to the reversible aggregation of particles into elongated filaments.

It was the intent of the experiment being reported to ascertain if the osteopathic vertebral lesion would influence such reactions to the degree that the alteration could be demonstrated by staining the protein elements with ninhydrin and such was found to be the case. An attempt of an explanation of these phenomena is indicated.

2. *The Motor End Plates.*—It is reasonable to assume that the motor end plates respond to the same influences that activate the muscle fibers, as the motor end plate is an integral part of the motor unit. Stimulation of the nerve activates the motor end plate which in turn activates the muscle fiber. The three structures acting as a unit respond to the same influences.

The shape of the motor end plate on resting muscle fibre of the rabbit has been described.[27] Further experimentation has indicated that there is a difference between the morphological characteristics of the end plates on resting muscle and muscle fibers influenced by mechanical or chemical irritations[28-31] and that there are variations from one species to another.[32] There is no reason to believe, however, that there are physiological variations of any significance in the activity of the motor end plate in different species and it has been stated that even the biochemical reactions of muscles are similar.[33]

A preliminary report[34] on the effects of an experimental osteopathic vertebral lesion indicates that there are variations between the motor end plates located on resting muscle fibers and those located on muscle fibers removed from an area of osteopathic vertebral lesion. It was concluded that the wide variation in size was due to artefact formation rather than to a reversible physiological reaction. The motor end plate is located on the surface and adheres closely to the muscle fiber, probably underneath the sarcolemma.

Palpatory examination of the experimental animals indicated that there was a paravertebral rigidity in the muscle groups associated with the experimental osteopathic lesion, similar to that observed clinically. This could be considered evidence of disturbed activity of the efferent nerve supply.

The motor end plate located on the resting muscle fiber of the rabbit was a long oval plate-like structure with clear sharply defined plasmodesma. Between the meshes a fine granular material was located (Fig. 1). The motor end plate resting on the muscle fibers associated with an experimental osteopathic vertebral lesion indicated that there was a precipitation of the granules around the plasmodesma, which in some cases apparently altered the size and shape of the motor end plate (Figs. 12 and 13).

This reaction could have been due to an increase in the relative acidity of the musculature. Acid was used (10 per cent formic in aqueous solution) in the staining process to produce a precipitation of the metal salt into the nerve structures. In this staining reaction it is essential to maintain the hydrogen ion concentration of the solutions within narrow limits as an increase results in obliteration of cytoplasmic structures by virtue of the granular precipitation.

In the experiment being reported the staining solutions were maintained at the optimum hydrogen ion concentration and, therefore, the heavy precipitation was attributed to a relative acidity of the muscular tissue that was segmentally related to the experimental osteopathic vertebral lesion. This condition was to be expected as any muscular activity results in the production of a relative acid condition of muscle fibers. It is well established that the end result of muscle contraction is the accumulation of acid products and recently[35] it was stated that an accumulation of acid products undoubtedly plays a part in the alteration of the optical properties of the resting muscle fiber as compared to the same properties of a muscle fiber that has been stimulated. This seems to be substantiated by the reaction observed in this experiment, as the excess precipitation of granules was attributed to the accumulation of acid in the muscle.

The increased acidity of the muscle fibers would account for the heavy precipitation of Kühne's granules around the motor end plate; however, in some instances the granular appearance was not confined to the region of the motor end plate. The area of the motor end plate in the muscle fiber is more active than other areas from the standpoint of metabolism and is the region of profuse vascularization.[36] Therefore, it would be reasonable to expect this region to exhibit the greatest response.

From the evidence derived from this and previous experiments it was concluded that extreme variations in morphological characteristics and size of the motor end plate should be considered to be artefact formation, but that the motor end plates did exhibit variations in the accumulation of granular material around the meshes of the nerve net, which was attributed to a variation in the hydrogen ion concentration of the muscle fibers in a resting state as compared to that of muscle fibers that had been influenced by nerve stimulation.

The above discussion has considered only the motor end plates demonstrated by the gold chloride staining method. At one point in the experiment in which phase contrast objectives were used after staining with ninhydrin for 18 hours there was considerable contrast noted between the nerve and muscular elements. Examination of the termination of the nerve indicated the presence of a structure similar to that previously described by Boeke[18] and von Mollendorff[37] as the motor nerve ending. The usual plate like structure demonstrated by gold chloride was not seen. Rather the motor nerve ended in a scanty branching and globules of nerve material and Kühne's granules were not seen (Fig. 9). No conclusions were drawn from these observations but further investigation concerning these structures seems to be indicated.

3. *Routine Microscopy.*—The observation of the muscle fibers from the control animals by routine microscopy did not reveal variations from the normal histological characteristics of striated muscle. The nuclei of the muscle fibers stained well and the cross striations stained faintly. The edges of the muscle fibers were straight and parallel.

The experimental preparations exhibited minor variations when compared to the control sections. The edges of the fibers were parallel but not straight, the nuclei were hyperchromic, and the cross striations of the fibers were not demonstrated. Such a reaction has been described as accompanying severe inflammations, but the alteration in the stainability of the muscle fiber was attributed to the accumulation of lactic acid in the tissues rather than a localization of the irritation in the muscle.[38] In this experiment it is probable that the irritation from the experimental osteopathic vertebral lesion resulted in the alteration described. This alteration has been classified as early Zenker's degeneration.

In this experiment the affected fibers had lost the cross striations and exhibited a hyaline appearance. The muscle nuclei were hyperchromic. The pathology observed was apparently self-limiting and there is no reason to believe that the change was not reversible.

4. *Phase Contrast Observation.*—Phase contrast observation of striated muscle fibers demonstrated the cross striations adequately but the nuclei poorly, which was at variance with observations made on fixed stained sections (Figs. 3 and 4).

Comparing the control musculature to the superficial musculature removed from the area of the experimental osteopathic vertebral lesion revealed nothing of interest.

In the deep musculature of the segment containing the experimental osteopathic vertebral lesion there were alterations in some of the muscle fibers. Some muscle fibers were thickened, with heavy coarse striations and a loss of the morphological characteristics of the isotropic and anisotropic disks. These segments appeared similar to those described by Hall and others[39] as being in a state of muscle contracture (Figs. 16 and 17).

Striated muscles show tonic contractions and the posture of animals is due to a prolonged state of contraction of the muscles as a result of motor unit activity. In general, tonus is a natural phenomenon occurring as the result of functional activity. Muscle may be forced into a prolonged contraction as the result of artificial stimulation[40] and the reaction then is known as contracture. It has been mentioned that the word contracture as originally used had a precise although limited meaning. It has come to be a term without definition, convenient in its vagueness for the designation of various states of muscle shortening. In the present experiment the term "contracture" was applied in the original sense as expressed by Gasser,[41] that is, in order to be contracture some part of the normal contractile mechanism must be involved, the change must be reversible, and tetanus must be excluded. It was also stated that the contracture may be the result of mechanical stimulations. These requirements are fulfilled by the results of this experiment and it seems safe to call the altered state of the muscle fibers segmentally related to the experimental osteopathic vertebral lesion a state of contracture.

An important fact is that all the muscle fibers did not exhibit such alteration, although it would seem reasonable to assume that if one fiber was irritated to the point of contracture all would be affected similarly. Inconsistency might be explained by the fact that the contracture is the result of irritation mediated by the nervous system and is not localized by virtue of the branching of the motor nerve. By branching the motor neuron controls many muscle fibers which probably tends to lower the effective threshold of reaction. By this device the organism is rendered more delicately responsive to stimulation originating in its environment.[42] If this balance is disturbed it would not be probable that all of the motor units would be affected to the same degree unless the irritation were extreme, which is certainly not characteristic of the osteopathic vertebral lesion. It would follow that the vertebral lesion does not involve all of the motor units of the segment. The latter seems to be substantiated by clinical experience because even though the vertebral segments may be limited in motion the physiologic functional capacity of the vertebral column is limited but not eliminated. The contracture of some of the muscle fibers would explain the pain, rigidity, swelling, and limitation of motion which are characteristic of the osteopathic vertebral lesion.

The mechanisms involved in the production of contracture include the stimulation of the proprioceptors as an important source of stimulation, but do not exclude segmentally related structures as viscera as a potential primary etiological factor. It seems probable that segmental irritation originating from

postural imbalances or autonomic irritation originating from visceral structures could be the source of irritation that instigates the nerve stimulation to produce the contracture.

Reflexes thus established would involve the spinal centers and under these conditions would maintain the contracture for a long period. It has been shown that pain impulses increase the tone of muscle of the opposite side and diminish it on the same side. Inhibitory effects prevail even on the contralateral side as a result of efferent pain impulses which makes it appear probable that the latter exert an effect on the spinal reflex centers.[43,44] This would explain the bilateral effect of the experimental osteopathic vertebral lesion.

It has also been demonstrated that afferent pain impulses may alter the excitatory and inhibitory reflex responses not only quantitatively but also qualitatively and may lead to a reversal of the reflex pattern. Reciprocal innervation may be converted temporarily into co-contraction as the result of pain impulses and co-contraction may be temporarily changed into reciprocal innervation. These changes seem to be dependent on the alteration in muscle tone set up by afferent pain impulses.[40]

With these facts in mind it is possible to explain not only the physical findings observed accompanying the osteopathic vertebral lesion, but also the variation in histological appearance of the associated musculature. It is impossible to disregard any portion of the vertebral segment when considering the osteopathic lesion syndrome. The evidence of this experiment indicates that there is contracture of some of the muscle fibers in association with the vertebral lesion. Pain accompanies and follows the production of the vertebral lesion in animals, a fact which has long been observed at the clinical level. Thus there are established conditions necessary for the production of the alterations in physiology of the vertebral segments that through irritative reflexes may have far-reaching effects in visceral structures.

5. *Phase Contrast Observation of Ninhydrin Stained Sections.*—Ninhydrin was used in an attempt to ascertain if there were alterations in the protein components of the musculature segmentally related to the experimental osteopathic vertebral lesion when compared to musculature removed from control sections. By the modification of the staining method, as described previously, it was possible to observe the qualitative reaction as well as the quantitative.

It must be stressed that the ninhydrin reaction is not specific with any single protein and, therefore, the results must be evaluated carefully.[45] Apparently the reaction in this experiment was definite enough to be indicative, at least, that there were alterations in the protein content of the muscle fibers in association with the experimental vertebral lesion.

Grossly the staining reaction indicated in control staining reaction that there was a slow progressive reaction between the ninhydrin and the proteins of the muscle fibers. Microscopic examination of the muscle fibers at intervals indicated that there was a gradual differentiation of the myofibrillae due to absorption of the ninhydrin. This did not interfere with the demonstration of the cross striations, nor did it increase the differentiation of the nuclei.

The reaction indicated that muscle removed from the segments associated with the experimental osteopathic vertebral lesion contained less available protein for this staining reaction than did the control fibers. The staining reaction was much less in the experimental preparations than in the controls. It could be safely concluded that there was a reduction or alteration of the protein materials in the experimental sections.

The reaction of the ninhydrin in the control sections seemed to indicate that the majority of the protein material of the muscle fiber was located in long threads in the myofibrillae which substantiates the theories of muscle construction previously mentioned in this report. The longitudinal striations were not demonstrated in the experimental sections which would constitute evidence that the musculature from the experimental sections was in an altered state both histologically and physiologically.

An explanation for this reaction could be based on the observations of Mangun and Myers[46] who ascertained that there was a high component of ninhydrin-stainable substance in voluntary muscle under normal conditions and a tendency toward low values in nearly all pathological conditions except those with a high fever and creatinine retention, in which case the reverse was true. The effects observed in the present experiment would seem to substantiate these conclusions.

It is true that the breakdown products of muscle activity are acidic in nature; however, they are not chemically similar to the amino acids or the substances that produce a color reaction with ninhydrin and, therefore, need not be considered further.

6. *Vascular Supply to Striated Muscle.*—Phase contrast observation revealed the vascular supply to striated muscle adequately. In the control sections the vessels and capillaries were observed lying parallel to the striated muscle fibers and branches anastomosed across the fibers forming a syncytium.

In the musculature removed from the lesioned segments the appearance of the capillary bed was altered. For comparisons see Figures 5, 14, and 15. The blood vessels were dilated and congested; in many sections blood cells were observed on the surface of the muscle fibers. These alterations were noted in the sections in which the muscle fibers were altered and also in sections of the lesioned segment in which the muscle fibers were unaltered histologically.

It is probable that the vascular changes are the result of nerve irritation following the establishment of abnormal reflex activity. The irritation from the lesioning process instigates the reflex and the contracture from the osteopathic vertebral lesion is the maintaining factor. In every reflex a decisive stage is that initial one wherein there is started the centripetal impulse which in due course excites the central reaction and, insofar as sensation accrues to the central reaction, the peripheral receptive apparatus may be termed sensory. Sensation may not accrue although a central reaction may be set up.[47] This may be the underlying reflex involving the innervation to the musculature and its blood supply to the lesioned segments. The receptors were stimulated by the lesioning process which in turn instigated reflex activity and resulted in muscle contracture and vascular alterations.

Histologically the most important receptors, or end-organs, existing in parallel with the striated muscle fibers are the muscle spindles and neurotendinous endings. Fulton and Pi-Suñer[48] concluded that muscle

spindles are the receptors for stretch reflexes while the tendon organs are evidently tension recorders and that it is possible that they give rise to impulses which lead to reflex inhibition of the muscle itself. However, because the muscle is in a state of contracture the tendinous and spindle receptors are stimulated continuously and the result is the nerve irritation to the vasculature with functional disturbances as the result. See Figure 20 for a tendinous receptor.

It has been established that the muscles associated with the experimental osteopathic vertebral lesion are in an abnormal state and, therefore, irritative impulses emanate from them. These irritative impulses probably affect the balance of the autonomic nervous system which is manifested segmentally by the vascular disturbance, resulting in the vascular alterations observed in this experiment.

SUMMARY

An experimental osteopathic vertebral lesion was established in rabbits at the level of the fourth thoracic vertebra and at the same time a sclerosing solution (Varisol) was injected at the same level in other rabbits. The musculature of the experimental segments in both groups was removed and examined by routine histological and phase contrast microscopy. With the latter method the muscles were examined in the fresh state and after staining with ninhydrin up to 5 days.

The muscles removed from the animals with the experimental osteopathic lesion exhibited contracture, vascular alterations, and lack of staining reaction with the ninhydrin solution. Possible mechanisms were discussed.

It was not possible to compare the muscular reactions of the sclerosing solution to the experimental osteopathic vertebral lesion.

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THE IMPORTANCE OF NUTRITION

A staggering amount of information has been acquired concerning the various phases of nutrition and a considerable amount has been put to use successfully. Today the nutrition of the American people is relatively good. Simple starvation is rarely seen and obvious malnutrition encountered is commonly associated with disease and is of discoverable etiology.[1]

However, the problems associated with nutrition are by no means solved; the final answers are yet to be learned. Indeed, the Food and Nutrition Board of the National Research Council, in its tables on dietary allowances, uses the term "recommended allowances" in order to "avoid any implication of finality."

Nutrition, as Stieglitz[2] points out, is more than diet. Proper nutrition includes the digestion of food in the gastrointestinal tract and transport to and utilization by the tissue cells as well as ingestion of adequate and balanced amounts of all necessary food factors. In other words, nutritional disorders may be endogenous as well as exogenous. They may also be due to excesses as well as deficiencies, a fact which is frequently ignored.

Authorities today consider many of the changes of senescence to be primarily the result of cellular malnourishment. With this thought the far-reaching effects of nutrition come up for consideration. It has become practical to assume that geriatric medicine becomes applicable at about 40 years of age, but the actual beginnings of such common disorders as hypertensive disease, arteriosclerosis, and hypertrophic arthritis occur much earlier than their clinical signs and symptoms.[2] Thus the nutrition or the lack of nutrition of the very young may be responsible for the health or the lack of health of the aged.

At present more than forty individual factors are recognized as part of the picture of normal nutrition. Each must be correctly adjusted to the others, although it is evident that there is considerable leeway. Disproportionate amounts of one factor tend to change the actions of others. Serious imbalance may be set up through indiscriminate vitamin dosage. The action of some vitamins is synergistic while that of others is antagonistic. Some few produce symptoms of overdosage or deficiency while others are interdependent to a degree that makes it difficult to learn their exact role. In daily practice it is pertinent to remember that vitamin preparations are valuable for diagnostic and therapeutic purposes, but that their routine use is as apt to create health hazards as to correct them.[3]

Newer knowledge of protein nutrition and deficiency has made it necessary to alter many previously held beliefs concerning these processes. It has long been known that some protein must always be supplied to maintain the adult organism continuously, no matter how much energy is furnished in the form of carbohydrates and fat. It is now accepted by many investigators that the smallest amount of protein on which the average adult can maintain health is 70 grams daily. Recognition of protein deficiency is the responsibility of the physician and is ordinarily not difficult—the greatest impediment to diagnosis being the physician's failure to think of it. The effects of deficiency include decreased resistance to infection and shock, delayed wound healing, and impaired hepatic and gastrointestinal function. Correction is often a prolonged and arduous procedure.[1]

The consumption of an adequate dietary is by no means a simple matter of choice. To the contrary selecting and procuring food has become extremely complex. Cost is often the most significant single factor in determining choice. Ease of preparation and availability are also determining factors. Closely related to these three factors is the processing of foods. In recent years a number of new chemicals have been brought into use for the purpose. In many cases it is questionable whether existing knowledge of the metabolic processes of nutrition is sufficient to warrant approval of the use of such chemicals. This phase of nutrition is treated at length in an article[4] reprinted on the advertising pages of this JOURNAL.

Recognition of the basic importance of adequate nutrition is an integral part of the osteopathic concept. In the words of A. T. Still, "Nutrition must be in action on time and keep all parts well supplied with power, or a failure is sure to occur."[5]

A NEW YEAR

The organizational year of the Association runs from June to June. This month is an appropriate time to review and predict. Voluminous reports by officers, departments, bureaus, and committees are in process of preparation for presentation at the annual convention in July. Altogether those reports will fill

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several large books. They will indicate progress as a profession, an improvement in ability to serve, a better public relations position.

Members make an association. Officers, organization machinery, employed staffs are helpless if the membership adherence and interest are low. And so it is gratifying to see a steady increase in membership in the Association and in its constituent divisional organizations.

It is dues paying time and the early response this year is splendid and enthusiastic. One recent day's receipts from dues were probably the largest in history.

Not every member is satisfied completely with the success of osteopathic organizations. There is recognition of need for betterment. But, at the same time, there is tremendous and justifiable pride of accomplishment, achievement which can be catalogued, examined, and enjoyed.

The profession of the physician is in the limelight today as never before. Almost literally the doctor is being examined minutely by every element in society. His strengths were long ago recognized, acknowledged, accredited—even acclaimed. It is still fashionable for society to begin its studies of the practice of the healing arts in that mood. But in the pitiless light of the controversy over the economics of the distribution of medical care, every fault of the profession stands out clearly on the screen. Every weakness of every individual physician shows with uncomplimentary distinctness. Every expression by his organizations is scrutinized for its every shade of meaning. No deviation is overlooked, whether of individual culpability or group inefficiency.

So in the past doctors have organized their efforts at local and national levels in an effort to improve the services which society assigns to them, albeit under severe restrictions and rigid control. Perhaps in the future they will organize because they must. But until now their no mean efforts have been voluntary. The results have been good and can be better. Plans are laid for that improvement. That is why it is encouraging to note, at the beginning of a new year of effort, renewed evidence of membership solidarity.

R. C. McCAUGHAN, D.O.

THE 1950 CONVENTION

Every convention of the American Osteopathic Association is important—the 1950 Convention is of special import. Events and developments make it essential for representatives of the constituent organizations to gather and make decisions and plans. Progress in diagnostic and therapeutic methods make it desirable if not mandatory that osteopathic physicians come together for instruction, demonstrations, and discussion.

Pages 532 to 544 of this issue of THE JOURNAL are filled with material which should receive careful attention. There are on these pages the Convention story, the Official Family schedule, the list of exhibitors, the complete program, and an application blank for hotel reservations. Every member of the American Osteopathic Association is urged to consider these pages carefully. If he does he will be convinced that he and his profession will be best served by his attendance at the Annual Convention at the Stevens Hotel in Chicago, July 10 to 14, inclusive.

Proposed Amendments to the Constitution and Bylaws of the American Osteopathic Association

R. C. McCAUGHAN, D.O.
Executive Secretary

(References to articles and sections are to the edition of the Constitution and Bylaws in the Directory of Osteopathic Physicians, 1950, published by the Association.)

BYLAWS

Article II—Membership

(The following proposed amendment submitted by the Wisconsin Association would permit the granting of an Honorary Life Membership to members who have not reached the age of seventy-five but who have practiced for at least fifty years and who qualify in other respects.)

Amend Section 4 by deleting the first sentence and by substituting therefor the following sentence: "Upon the recommendation by official action of a divisional society, a member who has reached the age of seventy-five, or who has completed fifty years of osteopathic practice, whichever comes first, and who has been in good standing for twenty-five consecutive years immediately preceding, may be elected by the Board to Honorary Life Membership."

Article III—Fees and Dues

(The following proposed amendment would raise the joint membership fee.)

Amend Section 1 by deleting in the first sentence of the second paragraph thereof, the words "fifteen dollars ($15.00)" and substituting instead thereof the words, "twenty-five dollars ($25.00)."

(The following proposed amendment clarifies the provisions of the paragraph in question.)

Amend Section 1 by deleting present paragraph six thereof, and substituting therefor the following:

"Upon recommendation of the Committee on Membership Approval, the Board of Trustees or its Executive Committee may remit a part or all of the annual dues of members in good standing who, due to physical disability, maintain a limited practice or no practice. For just cause, properly authenticated, similar action may be taken by the Board of Trustees or its Executive Committee in regard to regular members not otherwise specifically covered by other provisions of this Article."

Article IV—Delegates: Methods of Election and Duties

(The following proposed amendment, submitted by the California Association, provides for the seating of delegates and alternates in the House of Delegates of the Association.)

Amend Section 3 by deleting the present section and substituting therefor the following: "A delegate having been seated shall remain the accredited delegate throughout the session. In the event that an accredited delegate fails to qualify and assume his seat when the House convenes on the second day of the session his accredited alternate may be seated. If a delegate, having been seated, finds himself unable on account of physical disability or other cause acceptable to the House to be present for any day or days of the session, his alternate may be seated for that period and shall continue as delegate until and if the previously seated delegate shall return for duty, in which case the alternate may, by direction of the House, be dropped from the roll and the previously seated delegate shall resume his seat in the House."

SPECIAL ARTICLE

The Use of Ethyl Chloride Spray to Relieve Somatic Pain*

DAVID A. GARDNER, D.O.
Kirksville, Mo.

Ethyl chloride has been used in the Diagnostic Clinics and Hospital of the Kirksville College of Osteopathy and Surgery as a pain relieving agent. It has been used especially in relieving and eliminating areas of referred pain which are found in conjunction with visceral disorders. It has been a valuable therapeutic agent in relieving the muscle spasm found in conjunction with the osteopathic lesion and has been used in preparing a patient for the manipulative treatment of articular lesions. This paper is an attempt to correlate those facts which are known about somatic manifestations of visceral disease, as well as those about the osteopathic lesion complex, and to formulate a reasonable basis for the use of ethyl chloride spray as a therapeutic modality.

Visceral dysfunction often makes its presence known by a painful stimulus conveyed through the sensory apparatus. This stimulus may vary in intensity from a dull aching pain to a sharp stabbing one with many gradations. Visceral involvement will usually make itself manifest by pain in a particular area, for example, the pain in the right shoulder characteristic of cholecystitis or the pain felt in the left arm when the coronary vessels are involved. Very often there are painful areas in the skin overlying muscle and joint dyscrasias as are observed in ankle sprains and knee injuries.

These painful areas or pain syndromes have a common characteristic, that is, careful search of the painful region will reveal the presence of areas of low threshold, the so-called "trigger" areas. Such regions have been described by many authorities, particularly Travell and her associates.[1,2] One such area, for example, consists of a discrete circumscribed zone, often no larger than a match head, located within the myofascial structures, that is, the muscles or periarticular tissues or in the skin. This area or zone is hyperesthetic to palpatory pressure or blunt probing and may be localized by exploration of the cutaneous surface with the needle. Stimulation of this trigger area will bring about referred pain in a distribution characteristic of the referent zone from visceral or other distant involvement. The trigger spot may be either within or remote from the zone of referral. Within this reference zone a change takes place. There is tenderness, muscular spasm or contracture, and fasciculation, along with certain vasomotor phenomena,[3] particularly vasospasm. Autonomic imbalance is thought to be the cause of these changes.

A functional criterion for the trigger spot has been offered by Travell.[1] She and her associates have shown that it may be inactivated characteristically by some interference with the afferent sensory apparatus such as an infiltrative block with an anesthetic agent or by spraying the overlying skin with ethyl chloride. The threshold of the trigger spot is elevated and will therefore no longer induce a referral of pain to the reference zone even upon mechanical stimulation of the spot.

Travell and Bigelow[4] have pointed out that the reference zones which are fired by irritation of trigger areas are constant. That is, a certain trigger spot, when stimulated with the needle, will induce a specific distribution of referred pain. These spontaneous zones have been reproduced by injecting hypertonic saline solution into various muscles and ligaments. While the patterns of distribution are constant, Travell also points out that they do not follow the apparent segmental relationship. There may be skipping over of whole segmental areas or only a portion of one or more areas may be involved. However, it must be remembered in this connection that the segmental relationships of the bipedal primate body have not been wholly worked out, and that when they are the seeming inconsistencies may well disappear.

Lewis and Kellgren,[5,6] in demonstrating the reference zones which were set up by injection of hypertonic saline, showed that in addition to the referred pain there was muscle contracture. The pain, vasospasm, and contracture as found by Travell, Berry and Bigelow[3] appeared in the regions of somatic musculature which are related to visceral structures.[7,8] Irritation or disorder of a viscus gives rise then to the same referred pain, vasospasm, and contracture as does the injection of hypertonic saline or the stimulation of the appropriate trigger spot. Although all of the answers are not known, this relationship is mediated in the spinal cord through the reflex pathways which determine the patterns of pain referral. Stimuli from the irritated viscus reach a given segment via the dorsal sensory element. Within the segment, the receiving neurons are in a state of facilitation as a result of continual bombardment of subliminal impulses. This state of facilitation spreads so as to involve an increasing number of the neurons of the segment. Indeed, if the condition persists for a sufficient time, the neurons of adjacent segments are also affected.[9] These hyperexcited neurons require only a little more stimulation to cause them to fire.[10] This "overloading" stimulus is furnished by stimulation of the proper trigger spot.

The cord, which serves as a receiving depot for impulses and in which the facilitation of the neuron pools takes place, is the center of the "vicious cycle," for it is from this center that impulses arising in a viscus are mediated to bring about somatic response. These somatic responses which take the form of pain referral areas then become sources of additional sensory impulses which return to the segment containing the facilitated neurons. The trigger spots in the periphery, which are capable of firing either spontaneously or by stimulation, serve as agents for the persistence of the cyclic bombardment.

In the osteopathic concept, the lesion is a factor which either initiates or maintains this cyclic bombardment circus movement. An osteopathic lesion is

*This article is based on a report given by the author before the Seminar on Osteopathic Fundamentals which meets biweekly at the Kirksville College of Osteopathy and Surgery under the direction of the Department of Physiology.

found and evaluated by its associated phenomena which are listed as follows:

1. Hyperesthesia of the paravertebral tissues and the overlying skin and muscles
2. Fasciculation of muscle tissue as well as contractures
3. Fundamental autonomic alterations such as vasomotor and temperature disturbances in the associated tissues.[11]

The structural derangement of bony articulation is the etiological factor which initiates the lesion. The tension or stretch placed upon the periarticular tissues, that is, the muscles, tendons, and ligaments by the lesion starts the myotatic firing into the cord segment via the dorsal roots where fibers then synapse with the anterior horn cells. The other neurons are then excited by the flow of impulses and the lesioned segment is in the state of facilitation listed above and described by Denslow and Korr and by Lloyd.[10,12-15]

Manipulation breaks into the "vicious cycle" by interfering with and eliminating one or more of its phases. The correction of the articular lesion, or the stretching and relaxing of contracted and fasciculated muscles, or both, is the method of entry. The impulses fired by these entities are slowed down or eliminated and facilitation is decreased. The other neural structures, disorganized by the subliminal bombardment of the segment, then begin to return to normal, but only if the articular lesion can be maintained at its structural norm. Thus the mechanism is clear by which a change in the somatic structures can reflexly induce a change in the visceral structures.[11,13]

Another means of attacking the somatic or dermal and myofascial components of visceral disorders is to eliminate the trigger spots which are associated with the pain referral areas. One of the defining characteristics of the trigger spot mentioned earlier in this discussion, was its inability to act as a causative agent of pain in the reference zone when it was neurally blocked with procaine or sprayed with ethyl chloride. The latter is the method of choice as it is simple to use and requires no special apparatus other than a bottle of the liquid equipped with a spray nozzle. When ethyl chloride is applied to a painful area or zone in the form of a fine spray, the pain is alleviated and the relief is often permanent. No clue to this action is found in the pharmacology of the liquid. It is a colorless, extremely volatile liquid with a low boiling point (12-13 C.),[16] which accounts for its forceful emergence as a fine spray from its container when the spring cap is tripped.

Papers have appeared from time to time dealing with the therapeutic uses of ethyl chloride spray in the treatment of various joint and tissue injuries.[17-21] Travell has awakened an interest in the use of the spray by her application of it to a wide variety of conditions.[1,22-24] Her view of the mechanism involved in its action is essentially that given above; there is a reduction in facilitation by a decrease in the number of subliminal stimuli through the elimination of the trigger spot. Interference with the cutaneous receptors perhaps will explain the pain-relieving effect. However, since skin anesthesia is not achieved, there must still be some considerable question concerning all the mechanisms involved.

Korr's work in the Research Laboratories of the Kirksville College of Osteopathy and Surgery[25-27] may eventually throw some light on this problem. His investigations have shown that the activity of sweat glands is altered in cutaneous areas which are related segmentally to articular lesions, or to visceral disorders, or to both. The change was in the direction of hyperactivity. Definite patterns have been charted in connection with clinically demonstrable pathology, such as biliary disease, peptic ulcer, coronary artery involvement, radiculitis, etc. Experimental pathology, such as alteration of structural balance with heel lifts and injection of hypertonic saline solution into the erector spinal muscles, also gives a picture of segmental relationship evidenced by this sweat gland hyperactivity. Enough work has been done to establish the relationship between patterns of skin sweating and the osteopathic lesion which was demonstrated by palpation and by the clinical signs of the lesion. Trigger spots likewise reveal their presence by this same hypersecretion.

The alteration of sweat gland activity is another autonomic change due to visceral or other distant pathology which is manifested in the somatic structures via the reflex arc and it is a concurrent effect of the same "vicious cycle." A tentative hypothesis might be presented to the effect that the "shock" of the ethyl chloride spray on the involved dermatomal area returns the hyperactive sweat glands to a normal or even subnormal state of activity, thus decreasing or even eliminating one source of afferent impulses. Thus the chilling effect of the spray which results from its extremely rapid evaporation may be the factor. This is probably the reason why frosting of the skin must be avoided, for if it is not, a new source of subliminal bombardment can arise. This would also explain the clinical results obtained by spraying trigger spots in an area distant from the zone of referred pain even though the cutaneous receptors directly overlying this zone have not been sprayed.

The response of a number of conditions to ethyl chloride spray has been marked. The results have been sufficiently promising to justify its widespread use in this Clinic as a means of expediting manipulative treatment which ordinarily could not be undertaken immediately because of the acute discomfort of the patient. In the treatment of acute low-back conditions resulting from lumbar, lumbosacral, and sacroiliac lesions, the spray has been extremely useful. A short application of spray, properly administered over the entire low-back area, has given sufficient relief from pain and muscle spasm to allow easy, nontraumatic, and pain-free manipulation of the involved joints. Rib lesions, both at the sternal and spinal articulations, have responded in a like manner after the skin overlying the articulations and the involved ribs has been sprayed.

Ethyl chloride spray has also been used to relieve the painful manifestations of the postcholecystectomy syndrome in which the referred pain in the right shoulder girdle has recurred a short time after the removal of the gallbladder. The trigger spots related to this syndrome are found in the supraspinatus and infraspinatus muscles and in the skin overlying the upper right abdominal quadrant. One to three sprayings of these areas have been sufficient to give lasting relief.

Travell and Rinzler[23] have used the spray in the treatment of the referred pain due to cardiac disease. It should be noted, however, that although the spray has relieved the pain, the electrocardiographic pattern characteristic of the condition has not been altered significantly. However, the angina of effort as well

as the effort dyspnea which is displayed by the cardiac patient is greatly diminished and the comfort of the patient is increased.

The cardinal point in therapy is the avoidance of frosting which is contraindicated, because pain is increased and the patient's discomfort is acute if "freezing" takes place. The patient should be warned that the spray is cold so that he will not be shocked by the sudden shower of spray. The technic used here is as follows:

1. A well ventilated cool room with good circulation of air is essential as ethyl chloride is an inhalant anesthetic.

2. No lighted cigarets or other sources of ignition are permitted in the room as ethyl chloride is extremely volatile and inflammable.

3. The skin of the area to be sprayed is exposed to room temperature for 5 to 10 minutes before spraying. This lessens the shock of the first application.

4. Glass containers with the spring type cap are used. Fine or medium sprays are best. Metal containers with screw caps have been found unsuitable.

5. Spraying is begun at a distance of 4 or 5 feet and is gradually moved closer until approximately 2 or 3 feet from the patient, at which distance it is maintained.

6. Spraying is done at an angle. The spray thus strikes the skin obliquely rather than at a right angle. This reduces the mechanical force of the spray which might otherwise serve as an undesirable stimulus.

7. Rhythmical sweeping motions are used thus preventing the spray from striking one place too long. These sweeps follow muscle lines, if possible, and each sweep of the spray completely traverses the whole area to be covered from end to end. The rate is approximately thirty to forty sweeps per minute.

8. Joints are completely sprayed, from well above to well below the joint.

9. Spraying is done intermittently, that is, for 2 to 3 minutes at a time with at least 1 minute of rest before starting again.

10. The spray is applied until the pain has been relieved. Sometimes spraying has been continued for 15 to 20 minutes, care having been taken to avoid frosting.

11. In joint involvements, the area is usually resprayed at least once more after pain relief and good motion have been obtained.

12. The mouth and nose should be well shielded when spraying the chest, shoulder, or neck, because ethyl chloride is a potent, quick acting general anesthetic.

13. Prolonged soft tissue manipulation is avoided immediately after spraying as the skin may be easily bruised at this time.

14. The process is repeated as often as is necessary to afford pain relief.

A small, but representative, group of case histories is presented here in order the better to illustrate the therapeutic application of this modality.

CASE REPORTS

Case 1. Male, aged 21, student. This patient sprained his right ankle in a fall on the afternoon of January 10, 1950. Pain, swelling, discoloration, and limitation of motion were present. Weight bearing was extremely painful and the patient stated that it took 30 minutes to walk the eleven blocks from his home to the Clinic. There was no roentgenologic evidence of fracture. The ankle was immobilized by strapping with 1 inch tape strips. On January 20 the patient returned and complained of increased pain. He was referred for ethyl chloride spray. The tape was removed and the ankle joint was sprayed according to the technic outlined above. No attempt was made to seek trigger spots. After the initial application, the patient was asked to walk. He did so, apprehensively, and was rather amazed to find that the pain had almost completely disappeared. The process was repeated three more times until no more pain was present and the foot could be put through its normal range of motion. The patient did not return to the Clinic, but reported daily for the next few days saying that he felt fine and was fully ambulatory.

Case 2. Male, aged 49, railroad laborer. This patient, suffering from intercostal neuralgia, entered the Clinic with a complaint of continuous girdle type pain. The pain which was dull in character, becoming sharp and lancinating on straining, bending, or lifting, was at the level of the sixth and seventh thoracic spine and followed the ribs.

Examination revealed a well-nourished, middle-aged male who appeared to be extremely weary. Laboratory examination showed no departure from the normal except an elevation of the leukocyte count and a slight elevation of the blood sugar. The tonsils were enlarged and injected and appeared to be chronically infected. Neurological, cardiovascular, and gastroenterological findings were not remarkable. There was evidence clinically and subjectively of the male climacteric. X-rays of the thoracic vertebrae showed moderate lipping of the vertebral bodies. Structural balance was good; however, Still's lesions could be palpated at the fifth, sixth, and seventh thoracic vertebrae. The tissues were tough, stringy, and tender to palpation. Attempted manipulation failed because of the pain and tenderness. The patient was then referred for spraying. Careful palpation revealed extremely tender spots to the right of mid-line in the erector spinal mass and in the pectoral muscles on the anterior chest wall. Light spraying of these tender areas eliminated the painful spots. The patient immediately on getting up was able to bend without pain. The ache was gone and the patient lifted one end of a treating table off the floor without experiencing the sharp pain. The spots were resprayed after which correction of the rib lesions was easily accomplished. The patient who was seen on the following day continued to be pain-free. Some tenderness was still present in erector spinae so the spray was reapplied and the tenderness disappeared. A report by mail from the patient 3 months later stated that he was still pain-free and had returned to work as a railroad sectio hand. His other symptomatology had also responded to the therapeutic regimen outlined.

Case 3. Female, aged 43, registered nurse. The presenting complaint was pain in the right arm. She was admitted to the Clinic October 25, 1949, with tenderness and paresthesia over the triceps of the right arm. The pain seemed to originate in the upper thoracic and lower cervical regions. Lesion pathology was palpated in these areas and there were trigger spots in the trapezius and deltoid muscles and in the skin overlying the triceps. No other organic cause for this pain radiation could be found and manipulation was attempted. No corrections could be made. The

right side and back of the neck and the shoulder girdle were sprayed. The trigger spots did not respond to palpatory pressure. Articulation of the cervicodorsal vertebrae was easily accomplished. The patient was not sure she felt better and was told to return on the following day. On her return she stated that she felt much better and was able to sleep on her right side. The same areas previously sprayed were resprayed and manipulated on October 26 and 28. Complete relief was afforded. There has been no recurrence.

Case 4. Male, aged 45, osteopathic physician. The presenting complaint was a dull aching pain in the left shoulder, present since 1945. Pain was dull and constant with occasional twinges of sharp shooting pain. Intensity has gradually increased over the past few years until it has interfered with patient's ability to treat patients manipulatively. The pain has begun to radiate down to the little finger of the left hand. The radiation is intermittent and no time relationship has been established. The electrocardiogram was negative for conduction defect of the myocardium. Laboratory findings were within normal limits. There were limitation of motion of the left shoulder and tenderness around the upper end of the humerus. Neurological examination revealed no evidence of pathology. The joint capsule appeared thickened. The deltoid showed a beginning atrophy, probably of disuse. Radiographic findings were negative for change in the bony architecture due to arthritis or shoulder-hand syndrome. The transverse processes of the seventh cervical vertebra appeared large on the radiographs, but there was no cervical rib and no Pancoast tumor. A diagnosis of mild periarthritis with chronic bursitis was made.

A test application of ethyl chloride spray over the entire shoulder girdle ameliorated the pain and increased the range of motion from 50 per cent to 90 per cent. Recheck on the following day revealed a partial return of pain and tenderness. Palpation of the trapezius located trigger spots which were resprayed. Pain relief was immediately noted. The patient returned to his practice and has been able to work successfully. He uses the spray as needed.

Case 5. Male, aged 32, radiologist. The patient has a duodenal ulcer demonstrable radiographically and has a history of remissions and exacerbations with one episode of hemorrhage in 1947. His presenting complaint was pain and stiffness in the upper and middle thoracic areas. Exploration of the skin for hypersecretion of the sweat glands showed a typical skin resistance pattern for duodenal ulcer. The patient complains of periods of pain and stiffness in the mid-back which coincide with episodes of gastrointestinal cramping and pain. Soft tissue therapy followed by manipulation affords no relief. Discrete extremely painful areas are found in the erector spinae masses on both sides of the mid-line. Pressure on these areas will start the cramping. A single application of ethyl chloride spray affords relief from both the mid-back pain and stiffness and from the gastric and duodenal spasm. Cramping ceases and relief lasts for from 3 to 5 weeks.

SUMMARY

A discussion of fundamental mechanisms of the "trigger spot" has been presented. The relation of these trigger spots to somatic and visceral pain, particularly as they furnish an explanation of the somatic component of the osteopathic lesion complex, has also been discussed. The use of ethyl chloride in the abolition of the afferent phase of the pain cycle has been described and several cases cited.

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CASE REPORT

Voluntary Cardiac Arrest

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Spontaneous fainting in an apparently healthy individual is not an unusual occurrence. It seldom happens, however, that a physician is present and is listening with a stethoscope to the patient's heart before and during the syncope.

The causes of spontaneous fainting are somewhat obscure, but are generally supposed to be due to temporary anemia of the brain. Just how this anemia is produced is not always clear. It has been variously ascribed to spasm of the cerebral arteries, carotid sinus reflex, and sudden lowering of the blood pressure. That it may be due to temporary cardiac arrest from purely psychic causes is also an interesting possibility as the following case report may demonstrate.

L. P., an 18-year old high school girl, was brought to the office with a history of occasional fainting spells, the latest of which had occurred the previous Sunday while she was sitting quietly in church. The attacks consisted of periods of unconsciousness lasting 1 or 2 minutes, unaccompanied by convulsions or other motor disturbances. After recovery of consciousness the patient was quite normal.

Questioning as to prodromal subjective sensations brought out the information that the attacks were usually preceded by intense concentration of mind on some particular internal organ, usually the heart. The girl had recently been studying physiology in school and her interest in various vital functions had been greatly stimulated.

The patient was a well developed and highly intelligent girl. Routine examination revealed no abnormalities. The heart rate was 72 per minute and there was no evidence of enlargement or arrhythmia. X-ray of chest and electrocardiographic studies showed no pathology.

While listening with the stethoscope to the heart, with the patient sitting, the examiner asked the girl to concentrate her thoughts on her heart as she had done before fainting. To his amazement the heart rate promptly began to slow down; the time between each beat lengthened and after about a minute the heart sounds ceased entirely. For a period of at least 5 to 7 seconds there was absolutely no precordial sound audible. Then the patient slowly collapsed like a falling tree.

Resuscitation measures were immediately undertaken and when the cardiac action was next checked a minute or so later, it was normal. The patient recovered consciousness promptly and an electrocardiogram taken immediately following the episode was normal.

SUMMARY

A case of spontaneous syncope from temporary cardiac arrest has been recorded. The only discernible cause for this occurrence was intense concentration on the part of the patient.

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Department of Public Affairs

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BUREAU OF PUBLIC EDUCATION ON HEALTH

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EXPERT TESTIMONY OF OSTEOPATHIC PHYSICIANS IN MALPRACTICE SUITS

The Supreme Court of Wisconsin recently rendered an interesting opinion in a case involving a complaint filed against two defendant doctors of medicine for alleged malpractice in diagnosis and treatment of a fracture of the plaintiff's right humerus. Upon a verdict in favor of the plaintiff, the court entered judgment against the defendants, jointly and severally. From the judgment, the defendants, doctors of medicine, appealed to the Supreme Court, which affirmed the judgment. The following statement of facts is quoted from the opinion:

On November 27, 1947, plaintiff Minnie Morrill fell in the basement of her home, striking her right arm against a post. She called her family physician, Dr. Komasinski, who took her to the hospital for X rays. Anterior-posterior and lateral views were taken by the hospital technician, Sister Constance, at the direction of Dr. Komasinski.

On November 28th Dr. Komasinski and Dr. Wright, the roentgenologist in charge of the X rays at St. Mary's Hospital, examined the X rays together. Exhibit 3, one of the X rays taken on the 27th, disclosed a fracture of the greater tuberosity, an outer piece of the humerus to which muscles from the back and shoulder are attached.

On the 30th further X rays of the arm and shoulder were taken by Dr. Wright. When these were developed Dr. Wright and Dr. Komasinski examined them together. Then, with the consent of Mrs. Morrill, Dr. Komasinski called Dr. Bump into the case because of his greater experience and specialization in surgery. The three doctors examined the X rays together and decided upon the treatment to be administered. They concluded that the arm should be placed at right angles to the body with the forearm pointing straight upward, in a position described by the witnesses as ninety-degree abduction and one hundred eighty-degree external rotation.

Dr. Bump, assisted by Dr. Wright, and with Dr. Komasinski looking on, placed the patient's arm in this position and applied a plaster of Paris cast. The plaintiff was then sent home where Dr. Komasinski visited her at regular intervals.

On January 2, 1948, the cast was removed. Plaintiff continued to have pain and complained of inability to bring her arm down at her side. She consulted one Dr. Madson, an osteopath at Rhinelander. He took X rays of plaintiff's shoulder, one of which showed a hairline fracture of the shaft of the humerus just below the shoulder joint, which was described by the medical witnesses as a fracture of the surgical neck of the humerus. There was a displacement of the lower fragment of the humerus of about three eighths of an inch. From the end of this fragment a calcium deposit of about one-half inch had accumulated extending toward the glenoid.

Dr. Madson advised the plaintiff to see Dr. Burns at the Wisconsin General Hospital. She consulted him on January 22, 1948. Dr. Burns examined her and advised that he could administer a general anesthetic and by manipulating the arm determine whether the spicule of bone near the joint was causing a block which prevented the arm from coming into normal position; that if it did, he could operate immediately and remove the spicule.

Plaintiff returned to Rhinelander and was sent by Dr. Madson to Detroit to see Dr. John P. Wood, an osteopathic surgeon.

Thereafter plaintiff was asked by Dr. Komasinski to submit to examination by Dr. H. C. Schumm, an orthopedic surgeon at Milwaukee.

All of these physicians, together with Dr. M. L. Jones of Wausau, testified at the trial for defendants.

Dr. Wood and Dr. Madson testified for the plaintiffs.

The Supreme Court stated in its opinion that the defendant medical doctors on appeal had raised the following important questions:

1. Is an osteopath licensed to practice surgery a competent witness to express an opinion as to the degree of care and skill to be exercised by one licensed to practice medicine and surgery?

2. Is a Michigan osteopath and surgeon who is not licensed to practice in Wisconsin a competent witness?

3. Can a jury finding of malpractice be sustained on the testimony of such osteopaths in the face of undisputed testimony of the heads of the orthopedic departments of the University of Wisconsin and Marquette University medical schools?

At the time of the filing of the complaint in this lawsuit, the legislature of Wisconsin had not yet amended the medical practice act so as to provide for the granting of a license to practice medicine and surgery to osteopathic physicians and surgeons licensed in Wisconsin. This law was not enacted and approved by the governor until July 7, 1949. The decision in this case is particularly interesting because of the discussion concerning the licensing of osteopathic physicians in the state. The court said at page 421:

Dr. H. H. Christopherson, a member of the Wisconsin state board of medical examiners for twelve years, testified that the examination required of those taking osteopathy and surgery was identical to the examination of those taking medicine and surgery, except that the osteopaths are not required to answer any questions on the subject of materia medica. The basic sciences, knowledge of which is required of those licensed as surgeons, are diagnosis, pathology, physiology, and anatomy. He further testified that in those subjects the examinations given to the osteopath and the medical applicant are the same.

Since the state licenses allopaths and osteopaths to perform surgery, it must be regarded as a common field concerning which both may testify.

The rule that a licensee of one school of medicine cannot testify as to conduct of a person licensed in another school of medicine is not involved in this case.

Counsel for respondents cites *Swanson v. Hood* (1918), 99 Wash. 506, 170 Pac. 135, and other cases to the effect that so long as the witness is sufficiently acquainted with the doctrine of the school of the defendant, and if the premises from which he testifies are those of defendant's own school, the witness is not disqualified simply because he himself belongs to another school.

The question of whether a witness possesses sufficient knowledge to qualify as an expert is generally one for the trial court, and unless it appears that in its determination the trial court is guilty of an abuse of discretion, his ruling will stand. *Anderson v. Eggert* (1940), 234 Wis. 348, 291 N.W. 365.

Appellants contend that the court erred in permitting Dr. Wood, who was licensed to practice in Michigan but not in Wisconsin, to qualify as an expert.

The statute, which authorizes the admission of such testimony, includes experts from Michigan.

Sec. 147.14 (2), Stats. ". . . practitioners in medicine, surgery, or osteopathy licensed in other states may testify as experts in this state when such testimony is necessary to establish the rights of citizens or residents of this state in a judicial proceeding and expert testimony of licensed practitioners of this state sufficient for the purpose is not available."

So far as the record discloses, the plaintiff consulted Dr. Wood, as she did Dr. Burns, for the purpose of determining what course of treatment to follow. Under such circumstances the court had no duty to require plaintiff to consult other osteopaths in Wisconsin to obtain testimony.

That plaintiff was unable to obtain medical witnesses in her behalf appears clearly: She and her counsel advised the trial court that they consulted six or seven physicians and surgeons licensed to practice in Wisconsin, and were advised that the diagnosis and treatment accorded plaintiff by defendants were faulty but that they would not appear and testify.

Appellants argue that Dr. Wood had no knowledge of surgery as practiced in Rhinelander or similar communities in Wisconsin. He did have knowledge of practice in communities of a size and similarly comparable to Rhinelander in the state of Michigan. There was no showing that the practice of surgery differs in the two states nor that surgeons in Wisconsin should be held to a less degree of skill or care than surgeons in similar communities in Michigan.

The Supreme Court then went on and discussed the evidence presented by both sides regarding negligence in the care of the fracture. It was the opinion of the court that there was sufficient proof in the record to establish the presence of negligence on the part of the defendants.

The question of whether a physician of one school of practice may testify in a case which involves the practice of a physician of another school of medicine has been considered by the courts of many states. It would appear that the case under discussion is of particular importance because it gives to osteopathic education and training a recognition often not recognized by lay persons. Perhaps it is an indication of an awakening by the courts of this country to the high quality of osteopathic education.—*Morrill v. Komasinski*, 256 Wis. 417 (1950).

Department of Public Relations

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BILLS IN CONGRESS

HR. 1512—To recognize chiropractors in the Medical Department of the Veterans Administration. Hearing before a subcommittee of the House Veterans Affairs Committee on May 11, 1950.

HR. 3209—Relating to dental nomenclature and dental specialists in the Veterans Administration. House Veterans Affairs Committee declined action on May 10, 1950.

HR. 4237—To amend the Optometry Act of the District of Columbia. Exempts licentiates in medicine and osteopathy. Hearing before Senate Committee on the District of Columbia, April 17, 1950.

HR. 7786—Mr. Cannon of Missouri. Making appropriations for the support of the government for the fiscal year ending June 30, 1951. In relation to Children's Bureau administration of maternal and child welfare title of Social Security Act, reenacts nondiscriminatory limitation: "That no part of any appropriation contained in this title shall be used to promulgate or carry out any instruction, order, or regulation relating to care of obstetrical cases which discriminate between persons licensed under State law to practice obstetrics: Provided further, that the foregoing proviso shall not be so construed as to prevent any patient from having the services of any practitioner of her own choice, paid for out of this fund, so long as State laws are complied with: Provided further, that any State plan which provides standards for professional obstetrical services in accordance with the laws of the State shall be approved." Passed House May 10, 1950.

HR. 8161—Mr. Kearns of Pennsylvania. To establish a Board of Education in the Federal Government.

HR. 8369—Mr. McCarthy of Minnesota. To authorize grants and loans to cooperatives and nonprofit associations, operating medical and hospital-care plans, for the acquisition, construction, and equipment of needed facilities. Substantially the same as S. 1805.

S. 247—National Science Foundation Act of 1950. The functions of the Foundation are: (1) to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences; (2) to initiate and support basic scientific research in the mathematical, physical, medical, biological, engineering, and other sciences, by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such basic scientific research and to appraise the impact of research upon industrial development and upon the general welfare; (3) at the request of the Secretary of Defense, to initiate and support specific scientific research activities in connection with matters relating to the national defense by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such scientific research; (4) to award, as provided in section 10, scholarships and graduate fellowships in the mathematical, physical, medical, biological, engineering, and other sciences; (5) to foster the interchange of scientific information among scientists in the United States and foreign countries; (6) to evaluate scientific research programs undertaken by agencies of the Federal Government, and to correlate the Foundation's scientific research programs with those undertaken by individuals and by public and private research groups; (7) to establish such special commissions as the Board may from time to time deem necessary for the purposes of this Act; and (8) to maintain a register of scientific and technical personnel and in other ways provide a central clearinghouse for information covering all scientific and technical personnel in the United

States, including its Territories and possessions." Public Law 507, approved May 10, 1950.

S. 1066, S. 2273, S. 3465—Providing for extension of the program of services for the physically handicapped. Hearings before a subcommittee of the Senate Committee on Labor and Public Welfare began May 3, 1950.

S. 1805—Cooperative Health Act. Hearings before Senate Committee on Labor and Public Welfare, subcommittee, May 9-11, 1950.

S. 2395—To provide a more expeditious method of payment to personnel of the armed services, the Coast Guard, the Coast and Geodetic Survey, and the Public Health Service who become mentally incompetent. Hearing before Senate Armed Services Committee, May 11, 1950. Bill amended to make medical officers with the degree of Doctor of Osteopathy in the armed services and the Public Health Service eligible to serve on boards of mental health as competent medical authority. Favorably reported May 11, 1950.

S. 3102—Relating to physically handicapped children. Hearing before subcommittee of the Senate Committee on Labor and Public Welfare, May 16-18, 1950.

S. 3501—Mr. Magnuson of Washington. To establish a Chiropractic Service in the Department of Medicine and Surgery of the Veterans Administration.

OXYLIN TABLETS BEING RECALLED

The Federal Security Agency's Food and Drug Administration on May 11, 1950, warned hospitals, physicians, pharmacists, and consumers that a drug is on the market which may cause poisoning. It is "Oxylin Tablets," uncoated, distributed by Drexel Laboratories and Louis E. Evon of Drexel Hill and Upper Darby, Pennsylvania.

The tablets contain dangerous amounts of boric acid. Sensitive individuals may get enough boric acid from the uncoated tablets to result in serious poisoning.

After the tablets had been on the market for years, the formula was changed by adding boric acid. When the Food and Drug Administration learned of this change during a routine factory inspection, the distributor started recalling shipments. However, he has not been able to tell the Food and Drug Administration where about 18,000 of the tablets are located. A portion of the remaining 15,000 which have been sold will not be reached by his recall.

Available records show that the tablets have been distributed in Maryland, New Jersey, New York, and Pennsylvania. The distributor does business along the Atlantic seaboard and as far west as Chicago.

People who have been using these tablets should discontinue use immediately. Dealers and others who have them should notify the Food and Drug Administration and return the tablets to the manufacturer.

This product is labeled for "intestinal toxemia, cystitis, grippe, and the common cold." It may also bear other similar claims.

The preparation may have been sold over drug counters or practicing physicians may have supplies in stock.

MARRIAGE AND DIVORCE RATES

For the third year in a row, both marriages and divorces in the United States declined, according to a preliminary tabulation of 1949 figures released recently by Federal Security Administrator Oscar R. Ewing.

The figures, compiled by the Public Health Service, show 1,585,440 marriages and an estimated 386,000 divorces in the United States in 1949. Since 1946, when both marriages and divorces were at the highest level in this country's history, marriages dropped 30.8 percent and divorces 36.7 percent.

According to final figures, there were 1,811,155 marriages in the United States in 1948. The provisional total for 1949 is 12.5 percent below that figure. The crude marriage rate for 1949 was 10.7 marriages per 1,000 population. This was the lowest since 1939 and was 13.7 percent smaller than the revised rate for 1948 or 12.4 marriages per 1,000 population.

The estimated total of 386,000 divorces for 1949 was 5.4 percent below the final estimate for 1948 of 408,000 divorces. The crude divorce rate for 1949 was estimated at 2.6 per 1,000 population, compared with 2.8 divorces per 1,000 population in 1948.

RENEW FEDERAL NARCOTIC AND MARIHUANA PERMITS

Osteopathic physicians and osteopathic colleges or research laboratories must renew their Federal narcotic permits every year before July 1. Failure to do so entails severe penalties.

On or before July 1 each osteopathic physician who wishes to dispense, prescribe, or administer marihuana in his practice must, under the provisions of the Federal Marihuana Tax Act, pay a $1.00 annual tax and register or re-register with the Collector of Internal Revenue for each of the districts in which he practices.

COMMITTEE ON SPECIAL MEMBERSHIP EFFORT

STEPHEN B. GIBBS, D.O.
Chairman
Coral Gables, Florida

DON'T LET IT HAPPEN AGAIN

The Committee on Special Membership Effort, and A.O.A. officers, trustees, delegates, and alternates may well be pleased with their efforts of the past year. A substantial gain in membership was made possible by a lot of hard work by everyone connected with the membership effort and the fine cooperation of the Membership Department in the Central office.

Last year when the time neared for dropping members for nonpayment of dues, the list was much too long. All those concerned with membership went into action and by means of extensive work, often at great personal sacrifice, succeeded in collecting many dues before the deadline was reached. We must not let that situation arise again. It is so unnecessary and costs so much in valuable time and in money which could be much better spent.

Your chairman has constantly urged early payment of dues to save unnecessary expense and added work. It appears that results are rewarding the efforts. Dues are coming into the Central office very well. It is surely gratifying to see that so many loyal members have heeded the plea for prompt payment. Now, every member is urged to get on the band wagon so that such trouble as we have had in the past can be avoided. Then the Membership Department and Committee on Special Membership Effort can devote all their time to obtaining new members. Give us a chance and we will show you a real membership enrollment.

Pay your dues right now if you have not already done so. *"This is membership year."*

STEPHEN B. GIBBS, D.O.

MEMBERSHIP REPORT AS OF MAY 1, 1950

Membership Count, April 1, 1950		7,721
Applications received in April, 1950	9	
Graduates licensed in April, 1950	33	
	42	
Deaths in April, 1950	2	
Gain in April, 1950		40
Membership Count, May 1, 1950		7,761

HONOR ROLL

Martin C. Beilke	Dorothy J. Marsh
Lester L. Hamilton	Henry Turner

Fifty-Fourth Annual Meeting American Osteopathic Association

Chicago, July 10-14

Grand Stairway, Stevens Hotel

During the week of July 10 the members of the American Osteopathic Association and their guests will spend their days in the Stevens Hotel which is headquarters for the 1950 meeting. The Technical and Scientific Exhibits will be assembled in the Exposition Hall, the General and Teaching Sessions will be held in the Grand Ballroom and the South Ballroom and Foyer, the House of Delegates will meet in the North Ballroom, and the Board of Trustees will hold their Sessions in Parlor Two. Many other Convention activities will take place within the Hotel as well as those of many of the allied and affiliated organizations. This and succeeding pages of THE JOURNAL present the Convention Program and as much material concerning all phases of the meeting as is available as this issue goes to press.

BUSINESS SESSIONS

The schedule of meetings of the Official Family—the Executive Committee, the Board of Trustees, and the House of Delegates—is given on page 536. The Board will begin its sessions July 4 at 10:00 a.m. The House will convene for its first meeting on Sunday, July 9. Both official bodies will be housed in the Stevens Hotel.

OPENING SESSION

The impressive opening ceremonies will begin at 10:00 a.m. on July 10 in the Grand Ballroom. The Convention will be called to order by President H. Dale Pearson. The Invocation will be given by Bishop J. Ralph Magee, president of the Council of Bishops of the Methodist Episcopal Church of the United States. The address of welcome will be made by Thomas R. Tull, president of the First District of the Illinois Osteopathic Association. Mrs. Douglas D. Waitley, president of the Auxiliary to the American Osteopathic Association, and Pearl S. Rittenhouse, president of the Osteopathic Women's National Association, will greet the assembly.

Dr. Pearson's Presidential Address will be followed by the Keynote Address, "The Integrated Concept of Health As Reflected in Osteopathy," which will be delivered by Leonard V. Strong, Jr.

GENERAL AND TEACHING SESSIONS

Integration of the osteopathic concept will not only be emphasized in the program material but also in its method of presentation as planned by Program Chairman C. R. Nelson. There will be only two teaching sessions each afternoon at which, pursuant to the theme of integration, physicians from every branch of osteopathic practice will speak on a central theme. Insofar as time permits, the daily themes will be begun in the morning general sessions and carried through the day. The themes have been taken from the list of the ten leading causes of death in the United States.

The teaching sessions will be attended by larger groups than in the past and will cover subjects more thoroughly than has hitherto been possible. Formal presentations of papers will be relatively short so as to allow time for questions and discussion. The osteopathic manipulative approach to each condition discussed will be demonstrated. The two afternoon teaching sessions will be held in rooms which are relatively close together, making it possible to go from one session to the other to hear particular phases of the same general subject discussed by particular physicians.

An outstanding event of the Wednesday morning session will be the Andrew Taylor Still Memorial Address, "An Evaluation of Our Educational Program," to be presented by Edward T. Abbott. Of special interest on Thursday morning will be a lecture on mental hygiene given by James V. Lowry, M.D., of the United States Public Health Service.

The Friday morning session will be devoted to a program on atomic medicine, the installation of officers, the Presidential Acceptance Address of 1950-51 President, Vincent P. Carroll, and the closing ceremonies of the Convention.

ENTERTAINMENT

The traditional President's Reception and Ball will be held Monday evening, July 10, in the Grand Ballroom at The Stevens. The big A.O.A. banquet is scheduled for Thursday evening, July 13, at the same hotel. A tea for women guests will be held on Monday afternoon, July 10, in McKinlock Court of the Art Institute of Chicago following conducted tours of the galleries.

AUXILIARY AND ALLIED ORGANIZATIONS

Many organizations are holding meetings in Chicago in order to take advantage of the presence of officers and members who will be attending the National Convention. Details concerning programs and the time and place of meeting as well as names of officers will be found in the program which is published on pages 540-542 of this issue of THE JOURNAL.

Academy of Applied Osteopathy.—The annual conclave will open with a luncheon on July 14. Meetings will begin immediately after and will continue through the afternoon and evening. Sessions are also scheduled for the morning and afternoon of July 15.

American Association of Osteopathic Colleges.—All-day meetings will be held on July 14 and 15 and a joint luncheon with the American Association of Osteopathic Examiners, the Bureau of Professional Education and Colleges, and the National Board of Examiners for Osteopathic Physicians and Surgeons will take place on Tuesday, July 11.

American Association of Osteopathic Examiners.—A meeting is scheduled for the morning of July 9 and the joint luncheon with the American Association of Osteopathic Colleges, the Bureau of Professional Education and Colleges, and the National Board of Examiners for Osteopathic Physicians and Surgeons for July 11.

American College of Osteopathic Obstetricians and Gynecologists.—The Executive Board will hold an all-day session on July 9.

American College of Osteopathic Pediatricians.—An afternoon meeting is scheduled for July 12.

American College of Osteopathic Surgeons.—The Executive Committee will meet the afternoon and evening of July 8.

American Osteopathic Academy of Orthopedics.—A luncheon meeting of the Board of Directors is scheduled for July 10.

American Osteopathic Golf Association.—The annual tournament will be held at Sportsman's Park the afternoon of July 11.

American Osteopathic Society for Study and Control of Rheumatic Diseases.—A meeting beginning at 10:00 a.m. and lasting until 8:00 p.m. has been scheduled.

Association of Osteopathic Publications.—A luncheon and meeting in conjunction with the Society of Divisional Secretaries will be held on July 8. A business meeting will follow the program.

Auxiliary to the American Osteopathic Association.—The annual meeting will open with an Executive Board Session on Sunday, July 9. Business meetings will begin on Tuesday and will continue until the close of the convention on Friday, July 14.

Gavel Club.—A breakfast meeting is scheduled for July 10.

National Board of Examiners for Osteopathic Physicians and Surgeons.—All-day meetings will be held on July 8 and 9 and an afternoon meeting on July 10. On July 11 the Board will hold a joint luncheon with the American Association of Osteopathic Colleges, the Bureau of Professional Education and Colleges, and the American Association of Osteopathic Examiners.

Osteopathic Cranial Association.—A banquet is scheduled for July 15 and morning and afternoon sessions for July 16.

Osteopathic Vocational Group of Rotary International.—A luncheon meeting with Chicago Rotary is planned for July 11.

Osteopathic Women's National Association.—Meetings at a luncheon on July 10 and at a breakfast on July 12 have been scheduled.

Society of Divisional Secretaries.—On July 8 a joint meeting with the Association of Osteopathic Publications will be held and will be followed by a business session.

ALUMNI MEETINGS

The alumni associations of the Chicago College of Osteopathy, the College of Osteopathic Physicians and Surgeons, the Des Moines Still College of Osteopathy and Surgery, the Kansas City College of Osteopathy and Surgery, and the Kirksville College of Osteopathy and Surgery have scheduled dinners on the evening of Wednesday, July 12. The Philadelphia College of Osteopathy alumni will meet at a luncheon on that date. The alumni of the Graduate School of the College of Osteopathic Physicians and Surgeons have planned a luncheon for July 11.

In addition to their dinner the Kirksville alumni will hold meetings of their House of Delegates from 8:00 to 10:00 a.m. on July 11 and 12.

FRATERNITIES AND SORORITIES

As this JOURNAL goes to press eight organizations in addition to the National Osteopathic Interfraternity Council have scheduled meetings at The Stevens during the Annual Convention. The Council will meet at a luncheon on July 10. Alpha Tau Sigma, the Atlas Club, the Axis Club, Delta Omega, Iota Tau Sigma, and Phi Sigma Gamma have planned dinner meetings for Tuesday, July 11. Dinners will be held by Phi Sigma Alpha and Sigma Sigma Phi on July 10.

In addition to dinners, the Atlas Club is having a breakfast on July 11 and Sigma Sigma Phi is meeting at 5:00 p.m. on July 10.

SERVICE CLUBS

All osteopathic Rotarians are invited to attend the regular luncheon meeting of the Chicago Rotary at the Sherman Hotel on Tuesday, July 11. The guest speaker will be W. Ballentine Henley, president of the College of Osteopathic Physicians and Surgeons, Los Angeles.

P.E.O. will hold a luncheon meeting at The Stevens on July 11 at which Dr. Mary Golden of Des Moines, Iowa, will be the guest speaker.

Skyline at South End of Grant Park—Stevens Hotel at Extreme Left

Entrance of A. T. Still Memorial Building

LOCAL CONVENTION COMMITTEE

OFFICERS

Honorary Chairman—George H. Carpenter
General Chairman—Robert K. McCarty
Assistant General Chairman—Wesley B. Larsen
Secretary—A. Virgil Manskey
Treasurer—George F. Marjan

COMMITTEES

Chairman of Facilities—Martin C. Beilke
Hotels and Reservations—A. A. Graham
Scientific Exhibits—Jack H. Grant
Laboratories—William J. Loos
Decorations—Darl Brewer
Chairman of Entertainment—William Wood
Banquets and Entertainment—A. S. Guernsey
Entertainment of Women Guests—Mrs. Thomas R. Tull
Golf—Robert N. Evans
Chairman of Clinics—Ward E. Perrin
Chairman of Information and Local Transportation—J. G. Wagenseller
Chairman of Public Relations—Mr. Albert S. Gardner
Newspapers—Robert H. Brown
Radio—Leon Page
Service Clubs—W. C. Eldrett
Chairman of Attendance Promotion—E. C. Borton

Assistant Program Chairman—Lyle R. Barnum

Women's Activities

Women osteopathic physicians, members of the Auxiliary to the American Osteopathic Association, wives of osteopathic physicians, and women who are guests constitute a large and important segment of the attendants at the Annual Convention. For their instruction and their entertainment a number of activities are on the program.

All women attending the Convention will be guests at an informal tea given by the Local Convention Committee on Monday afternoon, July 10. Honor guests will be Mrs. H. Dale Pearson, wife of the President of the American Osteopathic Association, and Mrs. Douglas D. Waitley, president of the Auxiliary. The tea which will be given in McKinlock Court of the Art Institute of Chicago will be preceded by conducted tours of the Institute's galleries. All women will also be provided with tickets for the President's Reception and Ball on the evening of July 10 and for the A.O.A. banquet on Thursday night.

Osteopathic physicians will find their interests centered in A.O.A. business and teaching sessions and in the meetings of the auxiliary and allied groups. Many of them will include in their schedules the breakfast and luncheon scheduled by Osteopathic Women's National Association, the dinners of the various sororities, and the alumni banquets.

The second annual P.E.O. luncheon will be held at The Stevens on Tuesday, July 11.

The Auxiliary to the American Osteopathic Association has laid out a program which will fill the days of its members with a variety of activities. Business meetings will take place on Tuesday, Wednesday, and Thursday. Monday will be devoted to the Opening Session, the tea, and the Reception and Ball. Friday morning Auxiliary members will attend the Closing Session of the A.O.A. Convention.

Chicago Attractions

While it is well understood that the primary purpose of the Annual Convention of the American Osteopathic Association is to bring osteopathic physicians together for the furtherance of their education, for increasing their abilities, and for consideration and management of their professional affairs, it is not out of keeping with the spirit of the occasion to take advantage of a trip for relaxation and enjoyment. The City of Chicago offers almost limitless opportunity for entertainment and the pursuit of vacation happiness.

Not the least of Chicago's attractions—and particularly for osteopathic physicians—is the Andrew Taylor Still Memorial Building. The national headquarters of the American Osteopathic Association is a show place. Modern in concept and functional in design, it presents great beauty without sacrificing utility. It is a possession of which the osteopathic profession can be justly proud. Arrangements are being made to extend a special welcome to visitors during the Convention. It is hoped that no doctor attending the meeting will leave Chicago without a trip to Central office.

Kaufmann-Fabry

Chicago Museum of Natural History

Of special interest to the women attendants will be the Art Institute of Chicago, for it is there that the main entertainment feature for women will be held. The Art Institute houses the second largest collection of masterpieces in the United States and a library of 25,000 volumes.

The Chicago Museum of Natural History has one of the world's most complete exhibits covering anthropology, botany, geology, zoology, and related sciences. Collections have been made over the entire world and present a visual record of civilization from its inception.

Nearby is the Shedd Aquarium in which can be seen more than 10,000 specimens of fish and other aquatic creatures. The Aquarium is especially interesting to children, but its appeal is by no means confined to them.

Also in the same general area is the Adler Planetarium. Here the planets, the stars, the moon—the heavenly bodies—are reproduced and made to move in such a manner that their workings become more easily understood.

The Museum of Science and Industry preserves in the restored Fine Arts Building of the Columbian Exposition the most discussed exhibits of the 1893 and 1933 World Fairs. It also presents numerous more recent developments of science and industry. The management and arrangement of the Museum are unique.

Brookfield Zoo, which may be reached from downtown Chicago in less than an hour, is most unusual. Numerous animals are exhibited in surroundings which duplicate their native habitats.

The Chicago Historical Society, the Oriental Institute, the Academy of Sciences, the Chicago Public Library, and

many other institutions offer excellent and varied collections which will interest many visitors.

Lake Michigan is in itself a major attraction to Chicago. Its beaches are extensive and its steamers make daily trips to nearby towns.

During the summer open-air concerts are given in Grant Park by famous bands and orchestras. Frequently well-known soloists are presented. The fine quality of the music and the beauty of the setting make an evening spent at these concerts a memorable one.

There are many large radio stations in Chicago where some of the best known shows originate. It is always possible to secure tickets for broadcasts and to take tours of the stations when visiting here.

In addition to the attractions and inducements offered by Chicago itself, it is located in the center of a vast vacation land. The surrounding states of Michigan, Indiana, and Wisconsin boast facilities for almost every kind of outdoor pleasures, and reaching them from Chicago is quick and easy. The Great Lakes are traversed by steamers which are equipped to carry passengers travelling with or without cars. Either coming to or leaving Chicago by this route would make a happy contribution to a summer's enjoyment.

The foregoing by no means covers the possibilities for entertainment. Chicago offers an answer to practically every vacation demand. There are well-known department stores and specialty shops, famous restaurants, theaters, churches, facilities for sports, and excellent transportation.

There is no need to emphasize the principal reason for attendance at the Annual Convention—it is osteopathy and the Association's business. There is no reason for not combining business with pleasure and there are many excellent reasons for making the trip to Chicago a vacation for families as well as physicians.

Kaufmann-Fabry

Art Institute of Chicago

Golf Tournament

The Annual Golf Tournament of the American Osteopathic Golf Association, held in conjunction with the A.O.A. Convention, is an event which many doctors anticipate with pleasure.

Sportsman's Golf Course and Country Club will be the scene of this year's tournament. Located on the western edge of Chicago's North Shore, on Dundee Road, the Club with its two eighteen-hole courses has long been a favorite site for tournaments sponsored by various clubs and associations in and near the city.

The tournament, which will be held the afternoon of Tuesday, July 11, is under the chairmanship of Robert N. Evans, La Grange, Ill. Transportation will be arranged. For lunch and the green fee the charge will be $6.00. Reservations may be made for either one or both.

Annual Convention Registration Rules

Registration for the Fifty-Fourth Annual Convention of the American Osteopathic Association will begin July 7. The registration desk will be located in the Lower Level Lobby of The Stevens.

Preregistration.—For those who make application, preregistration service is available. Registering in advance assures you of being able to pick up your cards, badges, entertainment tickets, and general program without waiting in line at the Convention. Application blanks will be sent on request.

The following are the rules for registration:

Those who may register are: members of the Association, their children, and their adult guests who are not osteopathic physicians; osteopathic students; commercial and scientific exhibitors; nonmembers of the Association eligible for membership; nonmembers who are ineligible for membership but who show written evidence of membership in a divisional society; and employees of the Association and of the St. Louis Convention Committee.

Registration fees will be: $7.50 for members; $7.50 for adult guests; $4.00 for osteopathic students; $4.00 for juvenile guests 14 and under. (All registration fees are subject to federal entertainment tax.)

Doctors of osteopathy who are not members of the Association must pay a $25.00 fee in addition to the $7.50 convention registration fee.

Those who are apparently eligible for membership in the Association may register with the same privileges as members by applying for membership at the registration desk, tendering the $50.00 annual dues and paying the $7.50 convention registration fee. All such applications will be put through the regular channels. If the application is not acceptable, $25.00 of the $50.00 dues will be returned and the remainder retained as the regular registration fee charged all nonmembers.

Osteopathic physicians not eligible for membership in the Association may register but only upon the presentation of official, written evidence of current membership in a divisional society of the Association.

Divisional societies include state and provincial societies and the British and Australian Osteopathic Associations. Membership in a local, city, county, or district society is not sufficient for registration eligibility.

All classes of registrants may not attend all sessions of the Convention. While all registrants may attend the general sessions and are urged to do so, particularly the opening meeting on Monday morning, adult and juvenile guests may not attend the special group instruction meetings. However, all other privileges dependent upon the registration fee will be granted to these guests—R. C. McCaughan, D.O., Executive Secretary.

Kaufmann-Fabry

Golf in the Chicago Area

Schedule for Official Family

Board of Trustees
July 4-14—Parlor 2, Stevens Hotel
House of Delegates
July 9-14—North Ballroom, Stevens Hotel

Tuesday, July 4
10:00-10:30 Executive Committee
10:30-12:30 Board of Trustees
1:30- 6:00 Board of Trustees
*7:30-10:00 Board of Trustees

Wednesday, July 5
9:00-12:00 Board of Trustees
1:00- 6:00 Board of Trustees
*7:30-10:00 Board of Trustees

Thursday, July 6
9:00-12:00 Board of Trustees
1:00- 6:00 Board of Trustees
*7:30-10:00 Board of Trustees

Friday, July 7
9:00-12:00 Board of Trustees
1:00- 6:00 Board of Trustees
*7:30-10:00 Board of Trustees

*Evening meetings will be called only when necessity therefor is apparent.

Saturday, July 8
9:00-12:00 Board of Trustees
1:00- 6:00 Board of Trustees
*7:30-10:00 Board of Trustees

Sunday, July 9
9:00-12:00 Board of Trustees
12:00- 1:00 Registration of Delegates
1:00- 5:30 House of Delegates
7:00-10:00 House of Delegates

Monday, July 10
9:45-12:00 Opening Session of Convention—Grand Ballroom (Officers and Trustees on Stage)
2:00- 5:00 House of Delegates
6:30 Divisional Societies Dinner—South Ballroom
9:00 President's Reception and Ball—Grand Ballroom

Tuesday, July 11
8:00-10:00 Board of Trustees
10:00-12:00 House of Delegates
2:00- 6:00 House of Delegates
7:00 Fraternity and Sorority Banquets

Wednesday, July 12
8:00-10:00 Board of Trustees
11:00-12:00 Memorial Services—Grand Ballroom (Officers and Trustees attend in a body)
2:00- 6:00 House of Delegates
7:00 Alumni Banquets

Thursday, July 13
8:00-10:00 Board of Trustees
10:00-12:00 House of Delegates
2:00- 5:00 House of Delegates
6:30 American Osteopathic Association Banquet—Grand Ballroom

Friday, July 14
8:00-10:00 House of Delegates
11:00-12:00 Installation of Officers—Grand Ballroom

The Technical Exhibitors

CLAYTON N. CLARK, D.O.
Manager of Exhibits

A large number of medical supply houses will present exhibits at the Exposition Hall at The Stevens next month and their representatives will be ready to show their products and explain their services to every physician attending the Fifty-Fourth Annual Convention.

Hours can be spent visiting these informative displays and talking with the highly trained representatives. They furnish a practical education concerning the latest professional products of every kind and their uses. You will be able to apply promptly, for the benefit of your patients, many of the developments found in the exhibits.

These firms have spent much money and effort to put on a high-class exhibition. The fees they pay help to finance the Convention so they are entitled to the attention and interest of every member attending. Every doctor is urged to make a visit to each of the exhibits—not just a hurried casual review, but a leisurely, personal call at every booth. Members owe it as a courtesy and a duty to give wholehearted support to the exhibitors. The knowledge gained by such effort will more than repay any doctor for the time so spent.

Adjacent to the technical exhibits are the scientific exhibits, including interesting educational displays contributed by individual doctors and institutions. These will be well worth considerable time and study.

The Exhibition Hall will be open daily from 8:30 a.m. to 5:30 p.m., closing at 12 noon, Friday, July 14.

THE ALKALOL CO.
141 Washington St., Taunton, Mass. 66
A. S. ALOE CO.
1831 Olive St., St. Louis 3, Mo. 88
AMERICAN HOSPITAL SUPPLY CORP.
2020 Ridge Ave., Evanston, Ill. 113
APPLETON, CENTURY, CROFTS, INC.
35 West 32nd St., New York 1, N. Y. 5
BATTLE CREEK EQUIPMENT CO.
Battle Creek, Mich. 87
THE BIRTCHER CORP.
5087 Huntington Drive No., Los Angeles 32, Calif. 47
BISCHOFF CO.
Ivoryton, Conn. 53
P. BLAKISTON SON & CO.
1012 Walnut St., Philadelphia 5, Pa. 64
THE BORDEN CO.
350 Madison Ave., New York 17, N. Y. 100
BRISTOL MYERS CO.
1260 International Bldg., Rockefeller Center, New York 20, N. Y. 114
BROOKS APPLIANCE CO.
5 N. Wabash Ave., Chicago 2, Ill. 117
BUFFALOW MFG. CO.
Volunteer St. Life Ins. Bldg., Chattanooga 2, Tenn. 123, 124
BURDICK CORP.
Milton, Wis. 68
CAMERON HEARTOMETER CO.
666 W. Division St., Chicago 11, Ill. 89
CAMERON SURGICAL CO.
666 W. Division St., Chicago 11, Ill. 82
S. H. CAMP & CO.
109 W. Washington St., Jackson, Mich. 56
CARNATION CO.
Carnation Bldg., Los Angeles 36, Calif. 143, 144
CEREAL LACTIC CO.
Woodward, Iowa 103
CHAL-YON CORP.
65 Pine St., New York 5, N. Y. 60B
CHICAGO PHARMACAL CO.
5547 Ravenswood Ave., Chicago 40, Ill. 125
VINCENT CHRISTINA & CO., INC.
121 East 24th St., New York 10, N. Y. 24
CLAY-ADAMS CO.
141 E. 25th St., New York 10, N. Y. 105
THE COCA COLA CO.
730 Jefferson St. S., Chicago, Ill. 137
COMMERCIAL SOLVENTS CORP.
17 East 42nd St., New York 17, N. Y. 93
C. H. COMPERE & SON
P. O. Box 233, Wilmette, Ill. 42
CONTINENTAL HOSPITAL SERVICE, INC.
18636 Detroit Ave., Cleveland (Lakewood) 7, Ohio 67
DARTELL LABORATORIES
1226 S. Flower St., Los Angeles 15, Calif. 104
F. A. DAVIS CO.
1914 Cherry St., Philadelphia 3, Pa. 131
DE PUY MFG. CO.
Warsaw, Ind. 118
DESITIN CHEMICAL CO.
489 Fifth Ave., New York 17, N. Y. 79
DIONOL PHARMACAL CO.
Ferndale 20, Mich. 139
DODGE-DICKINSON CO.
Bloomington, Ill. 39
DOHO CHEMICAL CORP.
58 Varick St., New York 1, N. Y. 70
EHRHART & KARL, INC.
143 N. Wabash Ave., Chicago 47, Ill. ..... ½ of 112
EISELE & CO.
400 First Ave., N., Nashville 3, Tenn. 72
ELECTRO PHYSICAL LABORATORIES, INC.
720 Milton Rd., Rye, N. Y. 95

(Continued on page 545)

American Osteopathic Association
Fifty-Fourth Annual Convention

Hotel Stevens

Chicago

July 10-14, 1950

Program Chairman
C. R. NELSON
Ottawa, Ill.

Assistant Program Chairman
LYLE R. BARNUM
Barrington, Ill.

Associate Program Chairman
PAUL ATTERBERRY
Milwaukee

Monday, July 10

MORNING SESSION
Grand Ballroom

10:00 Call to Order
H. Dale Pearson, Erie, Pa.
PRESIDENT, AMERICAN OSTEOPATHIC ASSOCIATION
The National Anthem
Invocation
Bishop J. Ralph Magee, Chicago
PRESIDENT, COUNCIL OF BISHOPS OF THE METHODIST EPISCOPAL CHURCH OF THE UNITED STATES

10:10 Address of Welcome
Thomas R. Tull, Chicago
PRESIDENT, FIRST DISTRICT, ILLINOIS OSTEOPATHIC ASSOCIATION

10:35 Address
Pearl S. Rittenhouse, Glendale, Calif.
PRESIDENT, OSTEOPATHIC WOMEN'S NATIONAL ASSOCIATION

10:40 Address
Mrs. Douglas D. Waitley, Evanston, Ill.
PRESIDENT, AUXILIARY TO THE AMERICAN OSTEOPATHIC ASSOCIATION

10:45 Presidential Address
H. Dale Pearson, Erie, Pa.
PRESIDENT, AMERICAN OSTEOPATHIC ASSOCIATION

11:15 Keynote Address—"The Integrated Concept of Health As Reflected in Osteopathy"
Leonard V. Strong, Jr., New York City

11:55 Announcements

AFTERNOON SESSION A
Grand Ballroom

Chairman: W. Don Craske, Chicago
Theme: Accidental Injuries

2:00 Anesthesia for the Injured
George E. Hirschman, Chicago

2:20 Questions and Discussion

2:30 Craniocerebral Injuries
W. Don Craske, Chicago

2:50 Questions and Discussion

3:00 Skeletal Injuries
William E. Clouse, Chicago

3:20 Questions and Discussion

3:30 Burns and Visceral Injuries
Ellis Siefer, Chicago

3:50 Questions and Discussion

4:00 Hand Injuries
H. L. Collins, Chicago

4:20 Questions and Discussion

4:30 Summation
W. Don Craske, Chicago

AFTERNOON SESSION B
South Ballroom and Foyer

Chairman: Donald Siehl, Kirksville, Mo.
Theme: Accidental Injuries

2:00 High Points in the Management of Common Fractures and Dislocations of the Upper Extremities
Glen W. Cole, Norristown, Pa.

2:20 Questions and Discussion

2:30 Common Pitfalls in the Use of X-Ray in Cases of Injury
Jack H. Grant, Chicago

2:50 Questions and Discussion

3:00 Manipulative Management of Injuries of the Extremity
Wiley B. Rountree, San Angelo, Tex.

3:20 Technic Demonstration
Chairman: Wiley B. Rountree, San Angelo, Tex.
Harry L. Davis, Walla Walla, Wash.
Angus G. Cathie, Philadelphia
Quintus L. Drennan, St. Louis

4:00 Problems of Traumatic Cases Involving Insurance Companies
Mr. Raymond Nettleship, Los Angeles
NETTLESHIP INSURANCE COMPANY

4:20 Questions and Discussion

4:30 Summation
Donald Siehl, Kirksville, Mo.

Reserve Speakers:
C. Wallace Roehr, Seattle
Francis E. LeBaron, Foxboro, Mass.

Tuesday, July 11

MORNING SESSION
Grand Ballroom

Theme: Cardiovascular-Renal Syndrome

9:00 Call to Order

9:05 Anatomy Involved
Angus G. Cathie, Philadelphia

9:30 Physiology Involved
H. Ward Ferrill, Chicago

9:55 Pathology Involved
Virginia Foster, Kirksville, Mo.

10:15 Osteopathic Measures in Anoxemia and Lymphatic Stasis
Charles M. Worrell, Palmyra, Pa.

11:00 The Renal Phase of the Cardiovascular-Renal Syndrome
Neil R. Kitchen, Detroit

11:30 Arteriosclerotic Heart Disease
S. V. Robuck, Chicago

Reserve Speaker:
K. T. Steigelman, York, Pa.

AFTERNOON SESSION A
Grand Ballroom

Chairman: Stuart Harkness, Des Moines, Iowa
Theme: Cardiovascular-Renal Syndrome

2:00 The Osteopathic Internist's Viewpoint of Present-Day Management of Hypertensive Vascular Disease
Richard Denise, Des Moines, Iowa

2:20 Urological Pathologies Associated with Hypertension
Harold E. Dresser, Des Moines, Iowa

2:40 Manipulative Treatment and Its Effect on the Cardiovascular-Renal Syndrome
William O. Kingsbury, New York City

3:00 Psychosomatic Approach to Cardiovascular Disease
Floyd E. Dunn, Kansas City, Mo.

3:20 Panel Discussion

4:00—5:00 Manipulative Technic Demonstration
Chairman: William O. Kingsbury, New York City
Earl E. Congdon, Flint, Mich.
Fred L. Mitchell, Chattanooga, Tenn.
Thomas D. Webber, Saginaw, Mich.

AFTERNOON SESSION B
South Ballroom and Foyer

Chairman: Lowell M. Hardy, Portland, Me.
Theme: Cardiovascular-Renal Syndrome

2:00 Some Roentgen Findings in Cardiovascular-Renal Disease
Arthur H. Witthohn, Grand Rapids, Mich.

2:20 Questions and Discussion

2:30 Chronic Head Problems As Related to the Cardiovascular-Renal Syndrome
Ralph S. Licklider, Columbus, Ohio

2:50 Questions and Discussion

3:00 The Cranial Approach to the Cardiovascular-Renal Syndrome
Harold I. Magoun, Denver

3:20 Technic Demonstration
Chairman: Wilbur J. Downing, Chicago
Martin C. Beilke, Chicago
Malcolm A. Tengblad, Chicago
George F. Marjan, Chicago

4:00 Obstetrical and Gynecological Aspects of the Cardiovascular-Renal Syndrome
Roy G. Bubeck, Jr., Grand Rapids, Mich.

4:20 Questions and Discussion

4:30 Summation
Lowell M. Hardy, Portland, Me.

Wednesday, July 12

MORNING SESSION
Grand Ballroom

9:00 Call to Order

9:05 Symposium: A Coordinated Approach to Skeletal Components in Health and Disease
Clinical Studies (History and Physical Findings)
Max T. Gutensohn, Kirksville, Mo.
Clinical Studies (Palpation)
J. S. Denslow, Kirksville, Mo.
Physiological Studies
I. M. Korr, Ph.D., Kirksville, Mo.
Price E. Thomas, Kirksville, Mo.
Roentgenological Studies
George W. Rea, Kirksville, Mo.
Price E. Thomas, Kirksville, Mo.

11:00 Andrew Taylor Still Memorial Lecture: An Evaluation of Our Educational Program
Edward T. Abbott, Los Angeles

AFTERNOON SESSION A
Grand Ballroom

Chairman: Harold W. Fitch, Bushnell, Ill.
Theme: Pulmonary Disease

2:00 Clinical Anatomy in Relation to Pulmonary Disease
Leon E. Page, Chicago

2:20 Questions and Discussion

2:30 Pathogenesis of Bronchopneumonia and Its Concomitant Pathology
William J. Loos, Chicago

2:50 Questions and Discussion

3:00 The Physiologic Basis for Osteopathic Lesion Therapy in Pulmonary Diseases
H. G. Grainger, Tyler, Tex.

3:20 Manipulative Technic Demonstration
Chairman: J. Marshall Hoag, New York City
Reginald Platt, Houston, Tex.
Richard E. Martindale, Edgewood, Providence, R. I.
B. E. Walstrom, Dunedin, Fla.

4:00 Surgery and Chemotherapy in Pulmonary Diseases
Donald J. Evans, Detroit

4:30 Summation
H. W. Fitch, Bushnell, Ill.
Reserve Speaker:
David Green, Philadelphia

AFTERNOON SESSION B
South Ballroom and Foyer

Chairman: James G. Matthews, Jr., Highland Park, Mich.
Theme: Obstetrics, Gynecology, and Pediatrics

2:00 The Effects of the Forces of Restraint upon the Fetal Skull; Craniosacral Findings at Birth and Their Corrections
Beryl E. Arbuckle and Lester Eisenberg, Philadelphia

3:00 Technic Demonstrations—Cranial
Chairman: Thomas F. Schooley, Phoenix, Ariz.
William C. Rankin, Marietta, Ohio
Anne L. Wales, Providence, R. I.
Alan R. Becker, Jackson, Mich.

3:30 The Diagnosis and Treatment of Dysmenorrhea
Thomas R. Tull, Chicago

4:00 Technic Demonstration—Lumbar and Sacral
Chairman: H. V. Hoover, Tacoma, Wash.
Norman J. Larson, Chicago
W. Kenneth Riland, New York City
N. E. Atterberry, Denver

4:30 Summation
James G. Matthews, Jr., Highland Park, Mich.

Thursday, July 13

MORNING SESSION
Grand Ballroom

Theme: Degenerative Diseases

9:00 Call to Order

9:05 Pathological Considerations
Otterbein Dressler, Philadelphia

9:30 Questions and Discussion

9:40 A Biologic Concept of Degenerative Diseases
Alexander Levitt, Brooklyn

10:05 Questions and Discussion

10:20 Osteopathic Aspects of Degenerative Diseases
George W. Northup, Livingston, N. J.

10:45 Questions and Discussion

11:00 Mental Hygiene
Louis Jacobs, M.D., United States Public Health Service

AFTERNOON SESSION A
Grand Ballroom

Chairman: George W. Northup, Livingston, N. J.
Theme: Degenerative Diseases

2:00 Basis of Today's Degenerative Diseases
Clair E. Gore, North Hollywood, Calif.
2:20 Questions and Discussion
2:30 The Role of the Radiologist in Relation to Degenerative Diseases
Eugene R. Kraus, New York City
3:00 Orthopedic Problems Associated with the Degenerative Diseases
C. R. Starks, Denver
3:20 Questions and Discussion
3:30 The Manipulative Approach to Degenerative Diseases
Martin C. Beilke, Chicago
3:45 Manipulative Technic Demonstration
Chairman: Glenn W. Springer, Kansas City, Mo.
Clayton H. Morgan, Kansas City, Mo.
Esther Smoot, Kansas City, Mo.
Frederick A. Treffer, Kansas City, Mo.
4:15 Degenerative Diseases from the Surgeon's Viewpoint
A. C. Johnson, Detroit
4:35 Questions and Discussion
4:45 Summation
George W. Northup, Livingston, N. J.

Reserve Speaker:
Richard A. Schaub, Pasadena, Calif.

AFTERNOON SESSION B
South Ballroom and Foyer

Chairman: William A. Ellis, Grand Rapids, Mich.
Theme: Degenerative Diseases

2:00 Withering Flesh—A Tragedy or a Neuropsychiatric Challenge
K. G. Bailey, Los Angeles
2:20 Questions and Discussion
2:30 A Study of Degenerative Gynecological Diseases
Margaret Jones, Kansas City, Mo.
2:50 Questions and Discussion
3:00 Malignancies of the Head
A. B. Crites, Kansas City, Mo.
3:20 Questions and Discussion
3:30 Somatic Manifestations of the Degenerative Syndromes
Ward E. Perrin, Chicago
3:45 Manipulative Technic Demonstrations
Chairman: J. S. Denslow, Kirksville, Mo.
Wallace M. Pearson, Kirksville, Mo.
William C. Kelly, Kirksville, Mo.
Donald Siehl, Kirksville, Mo.
4:15 Proctological Aspects of Degenerative Diseases
Lester J. Vick, Amarillo, Tex.
4:35 Questions and Discussion
4:45 Summation
William A. Ellis, Grand Rapids, Mich.

Friday, July 14

MORNING SESSION
Grand Ballroom

Theme: Atomic Fission: Its Medical Aspects

9:00 Call to Order
9:05 The Radiations Hazards in Atomic Warfare
John Poehner, Chicago
10:00 Moving Picture—Naval Medical Research Institute
11:00 Installation of Officers
Address of Incoming President
Vincent P. Carroll, Laguna Beach, Calif.
12:00 Close of Convention

American Osteopathic Association Bureau and Committee Meetings

ACCREDITATION OF POSTGRADUATE TRAINING COMMITTEE

July 9, 2:00-5:00 p.m.—Private Dining Room 4
Chairman—Edward T. Abbott, Los Angeles

BUREAU OF PUBLIC EDUCATION ON HEALTH

July 3, 9:00 a.m. Meeting—Central Office Building
July 5-15, Headquarters—Parlor 12
Chairman—John P. Wood, Birmingham, Mich.

COMMITTEE ON PROFESSIONAL LIABILITY INSURANCE

July 9, 4:00-4:45 p.m. Closed Meeting of Committee—Private Dining Room 6
July 9, 4:45-6:00 p.m. Open Meeting—Private Dining Room 6
Chairman—Forest J. Grunigen, Los Angeles

CONVENTION CITY COMMITTEE

July 9, 7:30 a.m., Breakfast—Private Dining Room 5
Chairman—Roy E. Hughes, Indiana, Pa.

EDITORIAL ADVISORY COMMITTEE

July 13, 12:30 p.m., Luncheon—Private Dining Room 6
Chairman—Mrs. Katherine Becker, Chicago

1951 PROGRAM COMMITTEE

July 10, 12:30 p.m., Luncheon—Private Dining Room 6
Chairman—Paul Atterberry, Milwaukee

OSTEOPATHIC RESEARCH BOARD

July 8, 6:00 p.m., Dinner—Private Dining Room 5
July 9, 11, 2:00-5:00 p.m.—Private Dining Room 5
Chairman—S. V. Robuck, Chicago

OSTEOPATHIC RESEARCH CONFERENCE

July 12, 12:00 noon-5:00 p.m., Meeting—Private Dining Room 5
Chairman—S. V. Robuck, Chicago

Specialty Boards

ADVISORY BOARD FOR OSTEOPATHIC SPECIALISTS

July 9, 10, 11—Private Dining Room 4
Chairman—Collin Brooke, St. Louis
Secretary—Robert A. Steen, Chicago

AMERICAN OSTEOPATHIC BOARD OF SURGERY

July 6, 7, 9:00 a.m.-5:00 p.m., 7:00-10:00 p.m.—Private Dining Room 6
July 8, 9:00-12:00 noon—Private Dining Room 6
Chairman—James M. Eaton, Philadelphia
Secretary-Treasurer—Orel F. Martin, Coral Gables, Fla.

AMERICAN OSTEOPATHIC BOARD OF PROCTOLOGY

July 8, 9:00-12:00 noon, 1:00-4:00 p.m.—Private Dining Room 22
Chairman—George J. Towne, Los Angeles
Secretary-Treasurer—Randall O. Buck, Toledo, Ohio

AMERICAN OSTEOPATHIC BOARD OF OBSTETRICS AND GYNECOLOGY

July 4-14, Headquarters, Private Suite
July 6, 6:00 p.m., Dinner—Parlor 5
Chairman—Homer R. Sprague, Lakewood, Ohio
Secretary-Treasurer—Delle A. Newman, Detroit

Allied Organizations

ACADEMY OF APPLIED OSTEOPATHY

July 14, 12:30 p.m., Luncheon—Boulevard Room
2:00-5:00, 7:30-10:00 p.m.—North Ballroom
July 15, 9:00-12:00 noon, 2:00-5:00 p.m.—North Ballroom

President—H. V. Hoover, Tacoma, Wash.
President-Elect—George W. Northup, Livingston, N. J.
Executive Secretary-Treasurer—Kenneth E. Little, Kansas City, Mo.

July 14

Afternoon

12:30 Academy Luncheon
2:00 Keep the Gates of Life All Open
Harold I. Magoun, Denver
2:30 Discussion and Demonstration
3:00 Osteopathic Care of the Low Back
Perrin T. Wilson, Boston
3:30 Discussion and Demonstration
4:00 Specific Manipulation and Blood Chemical Changes
Stanley G. Bandeen, Louisville, Ky.
4:30 Academy Business Meeting
4:45 Technic Teaching Clinic

Evening

7:30 Symposium on Osteopathic Principles
Harold I. Magoun, Perrin T. Wilson, Stanley G. Bandeen, C. R. Nelson, H. V. Hoover, and George W. Northup
8:00 *Your* Academy of Applied Osteopathy
H. V. Hoover, Tacoma, Wash.
8:40 Announcement of Awards of the Academy Essay Contest
8:45 A Professional Adventure
George W. Northup, Livingston, N. J.

July 15

Morning

9:00 Technic Moving Pictures
9:30 The Postural Factor
C. R. Nelson, Ottawa, Ill.
10:00 Discussion and Demonstration
10:30 Clinical Applications of Osteopathic Research
J. S. Denslow, Kirksville, Mo.
11:15 The Third Academy Lecture: The Physiologic Basis for the Spinal Etiology of Disease
Irvin M. Korr, Ph.D., Kirksville, Mo.

Afternoon

2:00 Head's Law—An Osteopathic Application
H. G. Grainger, Tyler, Tex.
2:30 Discussion and Demonstration
3:00 The Pronator Syndrome
Warren A. Pratt, Upper Darby, Pa.
3:30 Discussion and Demonstration
4:00 Technic Teaching Clinic

AMERICAN ASSOCIATION OF OSTEOPATHIC COLLEGES

July 7, 8, 9:00 a.m.-5 p.m.—Private Dining Room 13
July 11, 12:00 noon, Luncheon*—North Assembly

President—Richard N. MacBain, Chicago
Secretary-Treasurer—J. S. Denslow, Kirksville, Mo.

*Joint Luncheon of the American Association of Osteopathic Colleges, American Association of Osteopathic Examiners, Bureau of Professional Education and Colleges, and National Board of Examiners for Osteopathic Physicians and Surgeons.

AMERICAN ASSOCIATION OF OSTEOPATHIC EXAMINERS

July 9, 9:00-12:00 noon—Private Dining Room 13
July 11, 12:00 noon, Luncheon*—North Assembly

President—Marion E. Coy, Jackson, Tenn.
Secretary-Treasurer—Mr. Dwight S. James, Des Moines, Ia.

*Joint Luncheon of the American Association of Osteopathic Examiners, American Association of Osteopathic Colleges, Bureau of Professional Education and Colleges, and National Board of Examiners for Osteopathic Physicians and Surgeons.

AMERICAN COLLEGE OF OSTEOPATHIC OBSTETRICIANS AND GYNECOLOGISTS

July 8, 9:00 a.m.-5:00 p.m., Executive Board Meeting—Parlor 20

President—Julian L. Mines, Glendale, Calif.
Secretary-Treasurer—Arthur A. Speir, Merrill, Mich.

AMERICAN COLLEGE OF OSTEOPATHIC PEDIATRICIANS

July 12, 1:00-5:00 p.m.—Parlor 13

President—F. Munro Purse, Philadelphia
Secretary-Treasurer—Thomas F. Santucci, Philadelphia

AMERICAN COLLEGE OF OSTEOPATHIC SURGEONS

July 8, afternoon, evening, Executive Committee Meeting—Private Dining Room 6

President—J. Gordon Hatfield, Los Angeles, Calif.
Secretary-Treasurer—Orel F. Martin, Coral Gables, Fla.

AMERICAN OSTEOPATHIC ACADEMY OF ORTHOPEDICS

July 10, 12:00 noon, Luncheon—North Assembly
Board of Directors' Meeting

President—Troy L. McHenry, Los Angeles, Calif.
Secretary-Treasurer—J. Paul Leonard, Detroit, Mich.

AMERICAN OSTEOPATHIC GOLF ASSOCIATION

July 11, 1:00 p.m., Tournament—Sportsman's Park

President—C. W. W. Hoffman, Syracuse, N. Y.
Secretary-Treasurer—Leland S. Larimore, Kansas City, Mo.
Chairman of Arrangements—Robert N. Evans, La Grange, Ill.

AMERICAN OSTEOPATHIC SOCIETY FOR STUDY AND CONTROL OF RHEUMATIC DISEASE

July 9, 10:00 a.m.-8:00 p.m.—Private Dining Room 22

President—C. O. Meyer, Des Moines, Ia.
Secretary-Treasurer—E. C. Andrews, Ottawa, Ill.

ASSOCIATION OF OSTEOPATHIC PUBLICATIONS

July 8, 12:30-5:00 p.m., Joint Luncheon and Meeting with Society of Divisional Secretaries—Private Dining Room 5

President—Mr. George W. Thomas, Harrisburg, Pa.
Secretary-Treasurer—Miss Josephine Seyl, Chicago

July 8

12:00-1:30 Luncheon
1:30 Solicitation of Advertising for State Publications
Speaker to be Announced
Discussion
2:20 Selection and Treatment of Material for State Publications
Guy E. Morris, Clarksburg, W. Va.
Discussion
3:10 Professional Articles—Do They Belong in State Journals?
Phil R. Russell, Fort Worth, Tex.
Discussion
4:00-4:30 Business Meeting of the Association of Osteopathic Publications
4:30-5:00 Business Meeting of the Society of Divisional Secretaries

AUXILIARY TO THE AMERICAN OSTEOPATHIC ASSOCIATION

JULY 9-14

Convention Theme: Ten Years of Progress
Headquarters: Stevens Hotel

President—Mrs. Douglas D. Waitley, Evanston, Ill.
President-Elect—Mrs. T. H. Lacey, Parkersburg, W. Va.
Treasurer—Mrs. Henry H. Watchpocket, Detroit
Recording Secretary—Mrs. Richard C. Rogers, Blackwell, Okla.
Corresponding Secretary—Mrs. George O. Rose, Chicago
Program Chairman—Mrs. J. G. Wagenseller, Chicago

The Executive Committee extends to all registered women guests an invitation to attend all meetings, business and social, with the exception of the Executive Board meetings.

July 9
Afternoon
President's Parlor

1:00 Executive Board Meeting

July 10
Morning
Grand Ballroom

9:45-12:00 Formal Opening of the A.O.A. Convention

Afternoon
Art Institute of Chicago

2:00- 3:00 Tours of the Art Institute
3:00- 4:30 Informal Tea Honoring Mrs. H. Dale Pearson, wife of the President of the A.O.A., and Mrs. Douglas D. Waitley, President of the A.A.O.A.

July 11
Morning
The Towers

9:00-12:00 House of Delegates

Afternoon
The Towers

1:30- 2:00 Psychology in Marriage
Edwin F. Peters, Ph.D.
PRESIDENT, DES MOINES STILL COLLEGE OF OSTEOPATHY AND SURGERY
2:00- 4:00 House of Delegates

July 12
Morning
The Towers

9:00-10:45 Round Tables

Grand Ballroom

11:00-12:00 A. T. Still Memorial Service

Afternoon
West Ballroom

12:30- 2:30 Luncheon for State Presidents and Executive Board
State Presidents Council
President's Parlor
2:30- 4:00 Executive Board Meeting

July 13
Morning
The Towers

9:00-12:00 House of Delegates

Afternoon
Boulevard Room

1:00- 3:00 Installation Luncheon
Address
H. Dale Pearson
PRESIDENT OF THE AMERICAN OSTEOPATHIC ASSOCIATION
Dramatic Monologue
Miss Harriet Allyn, Evanston, Ill.
Installation of Officers
Installation Address
Mrs. T. H. Lacey, Parkersburg, W. Va.
PRESIDENT, AUXILIARY TO THE AMERICAN OSTEOPATHIC ASSOCIATION, 1950-51
President's Parlor
3:30- 5:00 1950-51 Executive Board Meeting

July 14
Morning
Grand Ballroom

11:00 Installation of A.O.A. Officers
Introduction of Mrs. T. H. Lacey,
1950-51 PRESIDENT OF A.A.O.A.

GAVEL CLUB

July 10, 7:30 a.m., Breakfast—Private Dining Room 5

President—Asa Willard, Missoula, Montana
Secretary—Walter E. Bailey, St. Louis, Mo.

NATIONAL BOARD OF EXAMINERS FOR OSTEOPATHIC PHYSICIANS AND SURGEONS

July 8, 9, 9:00 a.m.-5:00 p.m.—Private Dining Room 21
July 10, 2:00-5:00 p.m.—Private Dining Room 21
July 11, 12:30 p.m., Luncheon*—North Assembly

President—S. V. Robuck, Chicago, Ill.
Acting Secretary-Treasurer—Paul van B. Allen, Indianapolis, Ind.

*Joint Luncheon of the National Board of Examiners for Osteopathic Physicians and Surgeons, American Association of Osteopathic Colleges, American Association of Osteopathic Examiners, and Bureau of Professional Education and Colleges.

OSTEOPATHIC CRANIAL ASSOCIATION

July 15, 6:30 p.m., Banquet—North Ballroom
July 16, 9:00-12:00 noon, 2:00-5:00 p.m.—North Ballroom

President—Reginald Platt, Houston, Tex.
Executive Secretary-Treasurer—Kenneth E. Little, Kansas City, Mo.
Program Chairman—Rollin E. Becker, Dallas, Tex.

July 15
Evening

6:00 Annual Banquet
8:00 Round-Table Discussion: Cerebrospinal Fluid—Its Role in Health and Disease
Speaker: Harold I. Magoun, Denver
Moderator: Reginald Platt, Houston, Tex.
Panel: Harold I. Magoun, Paul E. Kimberly, Thomas F. Schooley, Robert T. Lustig, Howard A. Lippincott, Anne L. Wales

July 16
Morning

9:00 Call to Order
Rollin E. Becker, Dallas, Tex.
9:05 Obtaining Knowledge Versus Information
William G. Sutherland, St. Peter, Minn.
10:00 The Management, Reactions, and Systemic Effects of the Cerebrospinal Fluid
Anne L. Wales, Providence, R. I.
11:00 Cranial Osteopathy and Electrobiology
Robert T. Lustig, Grand Rapids, Mich.

Afternoon

2:00 Mechanics of the Core Link
Thomas F. Schooley, Phoenix, Ariz.
2:45 Film Study in Cranial Osteopathy
George A. Laughlin, Kirksville, Mo.
3:00 Some Clinical Observations on Cerebrospinal Fluid Fluctuation and the Autonomic System
Edith E. Dovesmith, Niagara Falls, N. Y.
3:30 Lymphatics of the Head and Neck from the Cranial Viewpoint
W. Fraser Strachan, Chicago
4:00 Business Meeting

OSTEOPATHIC VOCATIONAL GROUP OF ROTARY INTERNATIONAL

July 11, 12:15 p.m., Chicago Rotary—Sherman Hotel, Ballroom

This is the regular meeting of the Chicago Rotary Club. All osteopathic Rotarians are invited to attend.

President—O. L. Brooker, Plymouth, Mich.
Secretary-Treasurer—J. S. Jilka, Lyons, Kans.

OSTEOPATHIC WOMEN'S NATIONAL ASSOCIATION

July 10, 12:00 noon, Luncheon—West Ballroom
July 12, 7:30 a.m., Breakfast—West Ballroom
Speaker—Lydia T. Jordan, Davenport, Iowa

President—Pearl S. Rittenhouse, Glendale, Calif.
Secretary-Treasurer—Florence I. Medaris, Milwaukee, Wis.

SOCIETY OF DIVISIONAL SECRETARIES

July 8, 12:30 p.m., Joint Meeting with Association of Osteopathic Publications—Private Dining Room 5
Business Meeting at 4:30 p.m.
July 10, 6:30-9:00, Dinner—South Ballroom

President—Roswell P. Bates, Orono, Maine
Secretary-Treasurer—P. Ralph Morehouse, Albion, Mich.

Alumni Meetings

CHICAGO COLLEGE OF OSTEOPATHY

July 12, 6:30 p.m., Dinner—Chicago College of Osteopathy

President—Walter P. Bruer, Detroit
Secretary-Treasurer—Walter C. Eldrett, Chicago

COLLEGE OF OSTEOPATHIC PHYSICIANS AND SURGEONS

July 12, 6:30 p.m., Dinner—Parlor 5

President—Philip T. Hoeffer, Los Angeles
Secretary-Treasurer—Harriet L. Connor, Los Angeles

DES MOINES STILL COLLEGE OF OSTEOPATHY AND SURGERY

July 12, 6:00 p.m., Dinner—North Assembly

President—Jean F. LeRoque, Des Moines, Ia.
Secretary-Treasurer—E. S. Honsinger, Ames, Ia.

KANSAS CITY COLLEGE OF OSTEOPATHY AND SURGERY

July 12, 6:30 p.m., Dinner—Parlor 6

President—Howard Baldwin, Tulsa, Okla.
Secretary-Treasurer—Luther W. Swift, Kansas City, Mo.

KIRKSVILLE COLLEGE OF OSTEOPATHY AND SURGERY

July 11-12, 8:00-10:00 a.m., House of Delegates—Parlor 13
July 12, 6:30 p.m., Dinner—Upper Tower

President—H. E. Rinne, Indianapolis
Secretary—W. D. Henceroth, Grove City, Ohio

PHILADELPHIA COLLEGE OF OSTEOPATHY

July 12, 12:00 noon, Luncheon—Private Dining Room 6

President—Guy W. Merryman, Collingswood, N. J.
Secretary—H. Willard Sterrett, Jr., Philadelphia

ALUMNI OF GRADUATE SCHOOL C.O.P.S.

July 11, 12:30 p.m., Luncheon—West Ballroom

Chairman of Arrangements—Edward T. Abbott, Los Angeles

Fraternities and Sororities

NATIONAL OSTEOPATHIC INTERFRATERNITY COUNCIL

July 10, 12:00 noon, Luncheon—Private Dining Room 5

President—Robert E. Purinton, Chicago
Executive Secretary-Treasurer—John W. Hayes, Liverpool, Ohio

ALPHA TAU SIGMA

July 11, 6:30 p.m., Dinner—Parlor 4

President—B. L. Agresti, Erie, Pa.
Secretary-Treasurer—A. E. Mantle, Dwight, Ill.

ATLAS CLUB

July 11, 7:30 a.m., Breakfast—Parlor 5
July 11, 6:20 p.m., Dinner—West Ballroom

President—Vernon Still, Elizabeth, N. J.
Secretary-Treasurer—P. E. Haviland, Detroit, Mich.

AXIS CLUB

July 11, 6:30 p.m., Dinner—Parlor 6

President—Eleanor George Brigham, Los Angeles, Calif.
Secretary—Frances White, Columbus, Ohio

DELTA OMEGA

July 11, 7:00 p.m., Dinner—Parlor 5

President—Alma Webb, Akron, Ohio
Secretary—Lucille M. Coffey, St. Petersburg, Fla.

IOTA TAU SIGMA

July 9, 9:00 a.m.-5:00 p.m., Meeting—Parlor 20
July 11, 7:00 p.m., Dinner—South Ballroom

President—Robert E. Morgan, Dallas, Tex.
Secretary—H. E. Rinne, Indianapolis, Ind.

PHI SIGMA GAMMA

July 10, 2:00 p.m.-5:00 p.m., Meeting—Parlor 13
July 11, 7:00 p.m., Dinner—North Assembly

President—John Pike, Albany, N. Y.
Secretary-Treasurer—Ellsworth B. Whitmer, Webster Groves, Mo.

PSI SIGMA ALPHA

July 10, 6:00 p.m., Dinner—Parlor 6

President—Carleton E. Towne, Tucson, Ariz.
Executive Secretary-Treasurer—John W. Hayes, Liverpool, Ohio

SIGMA SIGMA PHI

July 10, 6:00 p.m., Dinner—Parlor 5

President—George Marjan, Chicago, Ill.
Secretary-Treasurer—R. K. McCarty, Chicago, Ill.

Service Clubs

ROTARY

July 11, 12:15 p.m., Chicago Rotary—Sherman Hotel, Ballroom

Speaker: W. Ballentine Henley, LL.D., Los Angeles President, College of Osteopathic Physicians and Surgeons

Subject: Beautiful Mud, a Philosophy of Life

P.E.O.

July 11, 12:30 p.m., Luncheon—Stevens Hotel, Parlor 6

Speaker: Mary Golden, D.O., Des Moines, Iowa

Make Hotel Reservations Now!

Fifty-Fourth Annual Convention

American Osteopathic Association

Stevens Hotel, Chicago—July 10 to 14, 1950

Hotel reservations for the Fifty-fourth Annual Convention of the American Osteopathic Association, to be held in the Stevens Hotel; (famed Normandie Lounge pictured at right) Chicago, July 10 to 14, should be made directly through the Stevens Hotel, Michigan Boulevard, 7th to 8th Streets, Chicago 5, Illinois. A hotel reservation blank is included on the next page for your convenience.

Rates for Stevens Hotel

Single Rooms.....$5.00 to $10.00 Double Room with Double Bed.....$7.50 to $12.50

Double Room with Twin Beds.....$8.50 to $15.00

Suite with Living Room and Bedroom.....From $18.00

Note: Single rooms are extremely limited in number. You will stand a much better chance of securing accommodations if your request calls for rooms to be occupied by two or more persons.

Important!

Please read these instructions before filling out the application on the next page.

1. All reservations must be made directly through the Stevens Hotel, Michigan Boulevard, 7th to 8th Streets, Chicago 5, Illinois. Do not send reservations to the Local Convention Arrangements Committee or to the American Osteopathic Association Central office.

2. All requests for reservations must give the definite date and hour of arrival as well as the definite date and approximate hour of departure. Names and addresses of all persons who will occupy the reservations requested must be included.

3. If you expect to attend any meetings scheduled to be held in the Stevens Hotel prior to or after the National Convention itself, these meetings must be listed by name of group and the dates must be given.

Classifications of Eligible Applicants for Hotel Accommodations

Member, Officer or Trustee, Delegate or Alternate, Scientific Exhibitor, Technical Exhibitor

(over)

Application for Hotel Accommodations for

AMERICAN OSTEOPATHIC ASSOCIATION CONVENTION

Stevens Hotel, Chicago—July 10 to 14, 1950

See Reverse side for instructions and Hotel prices

Stevens Hotel
Michigan Boulevard, 7th and 8th Streets
Chicago 5, Illinois

Date.....

Meetings to Be Attended—Be Sure to Check!

Do you plan to attend a meeting to be held prior to National Convention?.....

If so, give name of group.....Dates .....

Do you plan to attend a meeting to be held after National Convention? .....

If so, give name of group.....Dates .....

Accommodations Desired

Single Room.....Double Room with Double Bed.....Double Room with Twin Beds.....
Suite with Living Room and Bedroom.....

Time of Arrival and Departure

Arriving at Hotel (date).....hour .....A.M.....P.M.....

Leaving Hotel (date) .....hour .....A.M.....P.M.....

Guests' Names

THE NAME OF EACH HOTEL GUEST MUST BE LISTED. Therefore, please include the name of both persons for each double room or twin bedded room requested. Names and addresses of all persons for whom you are requesting reservations and who will occupy the rooms asked for:

.....

.....

.....

.....

Individual Requesting Reservations

Name.....

Address.....

City.....Zone.....State .....

Name of Firm if Technical Exhibitor.....

ALL RESERVATIONS MUST BE RECEIVED PRIOR TO JUNE 20, 1950

TECHNICAL EXHIBITORS

(Continued from page 536)

ELECTRONIC SURGICAL EQUIPMENT CO.
Cor. 23rd & Arch Sts., Philadelphia 3, Pa. 69B
ENCYCLOPAEDIA BRITANNICA, INC.
20 North Wacker Drive, Chicago 6, Ill. 25
ENDOCRINE CO.
4409 Park Ave., Union City, N. J. 109
FARNSWORTH LABORATORIES
3206 N. Wilton Ave., Chicago 13, Ill. 102
H. G. FISCHER & CO.
9451 W. Belmont Ave., Franklin Park, Ill. 86
C. B. FLEET CO., INC.
921-27 Commerce St., Lynchburg, Va. 138
GRANT G. FORSYTHE, INC.
11 East 6th St., Tulsa, Okla. 44A
OTIS E. GLIDDEN & CO.
518 Davis St., Evanston, Ill. 96
GUILDCRAFTERS
P. O. Box 2862, Hollywood 28, Calif. 130A
GYNECOLOGICAL SPECIALTIES
413 Broadway, Alton, Ill. 156
HANOVIA CHEMICAL & MFG. CO.
Chestnut St. & N. J. RR Ave., Newark 5, N. J. 75
HARCO INDUSTRIES
5059 N. Clark St., Chicago 40, Ill. 45A
HILL LABORATORIES CO.
Lincoln Highway, Malvern 2, Pa. 90
HOLLAND-RANTOS CO.
145 Hudson St., New York 13, N. Y. 132
INTERNATIONAL VITAMIN DIV.
22 East 40th St., New York, N. Y. 115
PAUL E. JOHNSON MFRS., INC.
2508-10 South Parkway, Chicago 16, Ill. 27
JOHNSON & JOHNSON
Surgical Dressings Div., New Brunswick, N. J. 121, 122
LANTEEN MEDICAL LABORATORY, INC.
900 N. Franklin St., Chicago 10, Ill. 116
LAXIVATOR (MR. M. LAIR HULL)
Box 1200, Largo, Fla. 60A
LEA & FEBIGER
600 S. Washington Square, Philadelphia 6, Pa. 101
J. B. LIPPINCOTT CO.
227 S. Sixth St., Philadelphia 5, Pa. 84
McDOWELL MFG. CO.
Box 5840 Millvale Branch, Pittsburgh 9, Pa. 23
McKESSON APPLIANCE CO.
2226 Ashland Ave., Toledo 10, Ohio 126
D. C. McLINTOCK CO.
10 Mill Street, Paterson 1, N. J. 140
McMANIS TABLE CO.
314 S. Marion St., Kirksville, Mo. 108
MALLON CHEMICAL CORP.
58 Varick St., New York 1, N. Y. 71
F. MATTERN MFG. CO.
46-47 N. Cicero Ave., Chicago 30, Ill. 35, 36
MEDCO PRODUCTS CO.
3603 E. Admiral Place, Tulsa 12, Okla. 111
PHILIP MORRIS & CO. LTD., INC.
119 Fifth Avenue, New York 3, N. Y. 59
C. V. MOSBY CO.
3207 Washington Blvd., St. Louis 3, Mo. 106
V. MUELLER & CO.
320 S. Honore St., Chicago 12, Ill. 129
MAURICE NATENBERG
912 Gordon Terrace, Chicago 13, Ill. 55
NESTLE COMPANY, INC.
155 E. 44th Street, New York 17, N. Y. 85
NETTLESHIP CO.
727 Wilshire Blvd., Los Angeles 14, Calif. ..... Lower Lobby
WM. D. NEW CO.
185 N. Wabash Ave., Chicago 1, Ill. 37
NOVOCOL CHEMICAL CO.
2921 Atlantic Ave., Brooklyn 7, N. Y. 81
NUMOTIZINE INC.
900 N. Franklin St., Chicago 10, Ill. 91
ORTHO PHARMACEUTICAL CORP.
Raritan, N. J. 128
OTTAWA ARTHRITIS SANATORIUM & DIAGNOSTIC CLINIC
Ottawa, Ill. 41
PEPSI COLA CO.
1745 N. Kolmar, Chicago 39, Ill. 38
PET MILK SALES CORP.
1401 Arcade Bldg., St. Louis 1, Mo. 78
PLASTISHIELD, INC.
89 South Tenth St., Minneapolis 2, Minn. 130B
PROFESSIONAL EQUIPMENT CO.
615 S. Peoria St., Chicago 7, Ill. 97
PROFESSIONAL FOODS
219 First St., S.W., Cedar Rapids, Iowa 40
R. J. REYNOLDS TOBACCO CO.
1 Pershing Square, New York 17, N. Y. ..... A
THE RICHARDS MFG. CO.
756 Madison Ave., Memphis 7, Tenn. 107
RITTER EQUIPMENT CO., INC.
400 West Avenue, Rochester 3, N. Y. 110
J. B. ROERIG & CO.
536 N. Lake Shore Drive, Chicago 11, Ill. 142
ROSE DISTRIBUTORS
1904 W. Ogden Ave., Chicago 12, Ill. ..... 43, ½ of 44
RYSTAN CO.
7 N. MacQuesten Pkwy., Mt. Vernon, N. Y. 141
W. B. SAUNDERS CO.
W. Washington Sq., Philadelphia 5, Pa. 63
A. SCHLESSING & CO., INC.
3565 Lindell Blvd., St. Louis 3, Mo. 136
THE SCHOLL MFG. CO., INC.
211-13 West Schiller St., Chicago 10, Ill. 61
SEALY, INC.
666 Lake Shore Drive, Chicago 11, Ill. 58
SHAW-WALKER CO.
405 Lexington Ave., New York, N. Y. 73
SPENCER, INC.
137 Derby Ave., New Haven 7, Conn. 80
SPINALATOR CO.
504 Public Service Bldg., Asheville, N. C. 98-99
STETHETRON SALES CO.
Wenonah, N. J. 69-A
THE STUART CO.
234 E. Colorado St., Pasadena 1, Calif. 22
SUBURBAN SURGICAL SUPPLY
625 Grove St., Evanston, Ill. 46
TESTAGAR & CO., INC.
638 Bagley Ave., Detroit 26, Mich. 54
GEORGE C. TONG CO.
5912 Delmar Blvd., St. Louis, Mo. 6
S. J. TUTAG & CO.
800 Barrington Rd., Detroit 30, Mich. 92
UNITED FRUIT CO.
Pier 7, N.R., New York 6, N. Y. 119
UNITED STATES VITAMIN CORP.
250 E. 43rd St., New York 17, N. Y. 48
UNIVERSAL PRODUCTS CO.
Curren Arcade, Norristown, Pa. 28
VARICK PHARMACAL CO., INC.
75 Varick St., New York 13, N. Y. 94
VITAMIN PRODUCTS
2023 W. Wisconsin Ave., Milwaukee 3, Wis. 83
VITAMINERALS, INC.
1815 Flower St., Los Angeles 1, Calif. 62
WESTERN RESEARCH LABORATORIES
1401 Speer Blvd., Denver, Colo. 76
WHITTIER LABORATORIES
4210 Peterson Ave., Chicago 30, Ill. 120
WILCO LABORATORIES
800 N. Clark St., Chicago 10, Ill. 112
MAX WOCHER & SON CO.
609 College St., Cincinnati 2, Ohio 127
L. W. WRIGHT & CO.
1822 W. Van Buren St., Chicago 12, Ill. 74
F. E. YOUNG & CO.
422 E. 75th St., Chicago 19, Ill. 133
ZIMMER MFG. CO.
Warsaw, Ind. 57

Current Medical Literature

RECURRENT VERSUS NEW AND INDEPENDENT CARCINOMAS OF THE COLON AND RECTUM

J. W. Long, M.D., and others analyze a group of 30 cases in which a primary carcinoma had been removed at the Clinic a year or more prior to the return of the patient with a carcinomatous lesion in the same portion of the large intestine or rectum, in an article appearing in the April 12, 1950, *Proceedings of the Staff Meetings of the Mayo Clinic*. The study was prompted by the belief that carcinomas of the colon originate within large or small fields of tissue and enlarge both by cellular proliferation and progressive neoplastic conversion of tissue within such a field. A transition zone between a carcinomatous lesion of the colon and the adjacent mucosa has been found. This zone is used as the criterion for the existence of multiple carcinomas rather than the formerly established but unreliable concepts.

Specimens meeting certain standards were available from both operations. Both the gross specimens and microscopic fixed frozen-section tissues stained with hematoxylin and eosin were observed. From the 30 patients, 61 specimens were used.

Persistence of the first lesion was detected in 21 cases. The recurrent carcinomas showed no zones of transition. The growth pushed up the muscularis mucosae and mucosa and infiltrated these tissues or shoved them aside. Glands of the adjacent tissues were normal. The nuclei in the basement membrane remained in normal position within their cells. Gross appearance in some of the cases indicated that the lesion was a true recurrence. In 4 cases the anastomotic line was involved; in 2 the tumors appeared in the mesentery; in the remaining 17, for various reasons, the anastomotic line was not identifiable. The time between operations measured an average of 2.9 years. The mean survival time amounted to 1.5 years.

The lesions in the second group of 9 cases were called new and independent carcinomas on the basis of the presence

of a transition zone at the junction of the mucosa and the tumor, where the normal glands at the edges of the tumors were composed of cells with dark-stained nuclei that migrated away from the basement membrane, which gave the appearance of stratification; sometimes stratification actually existed. There was more evidence of mitosis than is usual in bowel mucosa. Large nucleoli were present. Actively malignant gland cells could be seen interspersing in the underlying tissues. If the lesion were advanced, the mucosa and the cancer tissue edges blended. A few glands had some normal and some cancerous cells. Lesions in 7 of 9 new and independent carcinoma cases arose adjacent to the line of anastomosis. The time interval between operations averaged 4.1 years. Survival time for 6 of the cases averaged 5.4 years, with 2 of the remaining cases dying in the hospital and the third not traced. Of the survivors, 4 are still living and well.

The poor prognosis in true recurrent carcinomatous lesions is no contraindication against surgical exploration, provided distant metastasis is not discovered. Bowel mucosa lying next to the primary lesion can be inspected for evidence of polyps and cancerous tissue, as can be the mucosa of the segment removed at the initial operation. If this evidence is found, the resection should be as extensive as possible.

Prognosis of the patients with new and independent lesions would seem most encouraging. This study was not sufficiently extensive to predict that a third of all suspected recurrent carcinomas will prove to be new and independent lesions.

In discussing the report, Malcolm B. Dockerty, M.D., pointed out that the reappearance of a carcinoma near an anastomotic site when an original lesion of the same kind has been removed from the large bowel results from portions of malignant tissue not removed by surgery, from the malignant transformation in a nearby polyp, and from new cancerous alterations in predisposed cells near the first growth. Surgery can benefit the patient whose tumors arise from the two latter sources. He stated that surgical exploration of cases now considered recurrences of colon carcinoma should be extended, since ascertaining the presence of a transition zone may be the basis of a hope for cure.

Edward S. Judd, Jr., M.D., says that two or even three operations should be contemplated for "recurrent" tumors because the growth may actually be a recurrence but many months or even years of palliation may be afforded by removal and the growth may prove to be a new primary or independent one for which the prognosis is good.

MYOCARDIAL INFARCTION

I. STATISTICAL ANALYSIS OF 679 AUTOPSY-PROVEN CASES

Studies on myocardial infarction made by Willard J. Zinn, M.D., and Richard S. Cosby, M.D., were reported in *The American Journal of Medicine*, February, 1950. Six hundred and seventy-nine cases proved by autopsy were analyzed statistically and the following conclusions were drawn:

1. The average age of death was 67.8 years.

2. Sex incidence was found to be 67.8 per cent men and 32.2 per cent women. This ratio of 2.1:1 is considerably different from other ratios previously offered which ranged from 4:1 to 7:1.

3. Women are more likely to suffer a fatal outcome from the infarct than men, as demonstrated by the increased mortality with single infarcts and the increase in instances of rupture of the heart in women.

4. The predilection of hypertension for the female was not demonstrated as previous reports stated.

5. The Negro race showed a distinctly lowered incidence of myocardial infarction.

6. Diabetics showed a greater incidence of infarctions in women and a decreased life expectancy of 3.6 years.

7. The causes of death are tabulated with particular emphasis on myocardial rupture and thromboembolism.

II. A RE-EVALUATION OF THE DIAGNOSTIC ACCURACY OF THE ELECTROCARDIOGRAM

Review of 256 autopsy protocols containing an electrocardiogram taken within 24 hours to 2 weeks after infarction resulted in the following conclusions:

1. The single precordial lead CF_{IV} in addition to the three standard leads offered patterns suggestive of myocardial infarction in only 51.5 per cent of 256 cases.

2. Evidence of infarction was found in 70 to 76 per cent of all cases reviewed in the history and physical examination alone.

3. Multiple precordial leads in addition to three standard leads gave evidence of infarction in 80 per cent of 50 necropsy cases.

4. Localization of the 111 infarcts was accurate in 76 per cent of electrocardiograms recorded with a single precordial lead.

5. Localization in 40 cases with multiple precordial leads was accurate in 92.5 per cent of cases.

6. The presence of either bundle branch block, left ventricular strain, or digitalis effect was the attributed cause of incorrect diagnosis in the presence of infarction.

7. Less than 3 per cent of cases with infarction exhibited normal electrocardiograms.

8. Multiple precordial lead technics seem to be indicated wherever the question of myocardial infarction arises.

MORTON TERRY, B.A., D.O

OBSERVATIONS ON THE PHYSIOLOGIC EFFECTS OF CORTISONE AND ACTH IN MAN

Clinical and metabolic studies of 33 patients who received Cortisone or ACTH or both in varying amounts for diverse periods are reported by Randall G. Sprague, M.D., and others in the *Archives of Internal Medicine*, February, 1950. In most cases the primary reason for the administration of the hormones was to study their effects on rheumatoid arthritis, rheumatoid spondylitis, acute rheumatic fever, disseminated lupus erythematosus, or psoriasis with psoriatic arthritis.

The data confirm the long suspected principle that Cortisone and ACTH are potent hormones with influence on a variety of physiologic processes, inducing in differing combinations the clinical and metabolic features of Cushing's syndrome, namely, rounding of facial contour, hirsutism, acne, keratosis pilaris, muscular weakness, edema, amenorrhea, cutaneous striae (purple), mental depression, impairment of carbohydrate tolerance (diabeticogenic), negative nitrogen balance, increased excretion of corticosteroids (urinary), and hypochloremic, hypopotassemic alkalosis.

These hormonal substances do not produce clinically significant hypertension. They do produce increased excretion of creatine and uric acid, increased salt retention early in the course of treatment but increased salt excretion after prolonged administration, and slightly increased excretion of calcium and phosphorus in the urine.

It also was observed that Cortisone depresses function of adrenal cortices. No change in leukocytes was evident, even in patients receiving therapy over long periods. ACTH stimulates secretion of 17-hydroxycorticosterone (compound F) rather than Cortisone. Compound F, administered for 12 days, was not attended by conspicuous metabolic effects.

MORTON TERRY, B.A., D.O.

AUREOMYCIN IN THE TREATMENT OF ANTHRAX

Herman Gold, M.D., reports in *The American Journal of Medicine*, January 1950, that aureomycin is quite effective in the treatment of cutaneous anthrax. Clinical control was achieved in 48 to 72 hours but bacteriological cure was not established until the fourth to fifth day of treatment. Clinically these patients responded as fast as or somewhat faster than patients previously treated with large amounts of penicillin but measured by the ability to recover organisms from lesions, response was slower.

Ease of administration, lack of sensitizing reactions, and the benefit of ambulatory management are noted. The fact that deaths occur from anthrax even after the use of large doses of penicillin makes welcome the appearance of another potent antibiotic which is effective in this disease.

MORTON TERRY, B.A., D.O.

Book Notices

PHYSIOLOGY OF THE NERVOUS SYSTEM. By John Farquhar Fulton, O.B.E., M.D., D.Sc., LL.D., Sterling Professor of Physiology, Yale University, Formerly Fellow of Magdalen College, Oxford. Ed. 3, revised. Cloth. Pp. 667, with illustrations. Price $10.00. Oxford University Press, 114 Fifth Avenue, New York 11, 1949.

Revision in accordance with the recent findings of Magoun and Rhines, McCulloch, Nulsen and others has been well accomplished in this fine textbook. Various developments, such as the finding of decreased protein content in the frontal lobe neurons, and the experimental treatment with the protein drug, malononitrite, are reported. The present status of the use of frontal lobotomy has been summarized and an extensive bibliography, considering the newness of the field, searched. The newly observed significance of the reticular formation, the realization of the exact location of autonomic centers of the forebrain, the existence of discrete functional localization in the forebrain, and other significant steps in understanding neurophysiological processes are noted.

Although these newer developments are included, this is an excellent basic text. The fundamentals of the subject are retained. At least a third of the book is devoted to morphology. The volume contains in fine type features such as historical notes, anatomical descriptions, and a review of controversial issues. This arrangement enriches the background of the subject but enables the selection of essentials for more detailed study and review. Summaries at the end of the chapters are so well presented that they could be consulted for cursory survey of the subject matter.

DISEASES OF THE FOOT. By Emil D. W. Hauser, M.S., M.D., Associate Professor of Bone and Joint Surgery, Northwestern University Medical School; Attending Orthopedic Surgeon, Passavant Memorial Hospital, Chicago. Ed. 2. Cloth. Pp. 416, with illustrations. Price $7.00. W. B. Saunders Company, West Washington Square, Philadelphia, 1950.

Among the revisions for this volume 10 years after the first edition are the use of cohesive bandage in infancy for congenital talipes equinovarus and congenital pes valgoplanus; improved surgical correction of hallus valgus, hammer toe, and metatarsalgia; correction of pes valgoplanus by special shoes and supervised gait; applied uses of antibiotics and anticoagulants, and other more recent therapeutic methods in the approach to circulatory affections of the foot.

Again the subject is covered comprehensively both by text and by illustration. Recommendations are fairly conservative. The osteopathic physician will find a chapter called "Technic for Manipulation of the Foot" interesting.

OCCUPATIONAL THERAPY. Edited by William Rush Dunton, Jr., M.D., Founder and Former Editor, Occupational Therapy and Rehabilitation, and Sidney Licht, M.D., Editor, Occupational Therapy and Rehabilitation. Cloth. Pp. 321, with illustrations. Price $6.00. Charles C Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Ill., 1950.

It is the physician who must know when occupational therapy is indicated as a part of treatment, and it is the trained therapist who must select the particular activity or craft. A knowledge of the goals and functions of occupational therapy on the part of the physician is a great aid to him and to the therapist in prescribing therapy for a particular patient. It is the aim of the present book to give this knowledge.

After several chapters devoted to the general principles of occupational therapy, the book continues with discussions of the services which are available as aids in the treatment of specific diseases such as tuberculosis, heart disease, psychiatric disorders, and cerebral palsy. Of especial interest is the chapter on occupational therapy for amputees, which describes in well-written detail the work which can be performed by these handicapped patients. The applicability of these services to patients with other disabilities can be easily seen. Particularly helpful is an analysis of crafts in terms of the joints and muscle groups which are benefited.

Besides the chapters on the usual arts and crafts of occupational therapy, there are several devoted to the less standard forms of activity for patients—education, library activity, and recreational therapy.

Many books and articles have been written about occupational therapy for professional therapists and many others for the lay public. This book is one of few to be written specifically for physicians.

ADVANCES IN SURGERY. Editorial Board—William DeWitt Andrus, New York, Chairman; Hugh Cairns, Oxford; Edward D. Churchill, Boston; Clarence Crafoord, Stockholm; Lester R. Dragstedt, Chicago; Emile Holman, San Francisco; John S. Lockwood, New York; D. W. Gordon Murray, Toronto; Alton Ochsner, New Orleans; Isidor S. Ravdin, Philadelphia. Volume II. Cloth. Pp. 462, with illustrations. Price $11.00. Interscience Publishers, Inc., 215 Fourth Ave., New York 3, 1949.

Subjects selected by the international board of editors to continue the high standards of interest and importance set by the first volume include in this second, "Pulmonary Function Studies in Relation to Chest Surgery," "Advances in Surgery of the Esophagus," "Surgical Treatment of Hypertension," "Portal Bed Block and Portal Hypertension," "Surgery of Congenital Anomalies of the Heart and Great Vessels," "Recent Advances in the Treatment of Craniocerebral Injuries," "Use of Streptomycin in the Treatment of Surgical Infections," "Advances in Skin Grafting," "The Pathology of Tumors of the Peripheral Nerves," "Testis Tumors," and "Advances in the Management of Pancreaticoduodenal Cancers."

Contributors were chosen as carefully as the subject matter. The series has the marked advantages of any such collection when it has been carefully edited. Since, as is apparent from the foregoing list of subjects, the volume includes matters related to surgery but not necessarily surgical, the general practitioner, too, will find the collection worthy.

EXHIBITIONISM. By N. K. Rickles, B.S., M.D., Fellow of the American Psychiatric Association, Diplomat of the American Board of Psychiatry and Neurology; Senior Consultant at the Veterans Administration Center, Los Angeles; Consultant in Psychiatry to the Office of the Surgeon General, Medical Department, United States Army; and Director of the Psychiatric Center of Seattle. Cloth. Pp. 198. Price $5.00. J. B. Lippincott Company, East Washington Square, Philadelphia, 1950.

The pathologic condition known as exhibitionism is seemingly incongruous with the patient's personality. However, the patients observed by the author had in common a syndrome which he carefully describes on the basis of his observations of case histories. Rickles believes that exhibitionism occurs as a minor symptom of another disease and there are many indications that it is not always a secondary symptom but a separate entity of the compulsive behavior type.

According to statistical analysis the incidence is 20 to 35 per cent of the total number of sex cases in any population; 70 per cent are affected by mental perturbation as severe as psychosis, although the more usual condition is that of compulsive neurosis. Since there is ample evidence that the condition is more psychoneurotic than perverted or psychopathic, Rickles urges the courts to assume a more scientific attitude toward apprehended exhibitionists. Psychic trauma to the child witness is in direct proportion to the magnitude of the hue and cry of parents or adults learning of the incident. On the other hand, although the exhibitionist is not a danger to the community, he is personally in need of adequate and

prolonged therapy, described herein. In a chapter called "The Medicolegal Aspects of Treatment" the author recommends an excellent program, part of which depends upon public understanding and support, which can be secured only by an educational program sponsored by physicians.

Here is a thought-provoking book written by a man with a humane mission. He has studied the historical and cultural frame; the psychic cause; the attitudes of the patient himself, his family, society, and the physician, commenting that unfortunately the professional attitude is in general neglectful, punitive, or both.

INTRODUCTION TO HUMAN ANATOMY. By Carl C Francis, A.B., M.D., Assistant Professor of Anatomy, Department of Anatomy, Western Reserve University, Cleveland, Ohio. Cloth. Pp. 470, with illustrations. Price $5.50. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1949.

"This textbook is an attempt to present in the smallest possible compass the essential facts of human anatomy." It would seem that the attempt has been successful, both in including the essential facts and in compressing them into an extremely small compass; but the ultimate test of a textbook is the way it stands up in classroom use, and the reviewer can only suggest that this book seems to have features that recommend its adoption. It is suitable for an introductory course in human anatomy on the junior college level or for courses designed for nurses or other ancillary medical personnel, but it is too compressed for the medical student. The illustrations, which are an excellent feature of the book, are largely schematic drawings, photographs and drawings of anatomical specimens, and photographs of parts of the living body, together with a number of illustrations credited to other publications. Color is sparingly, but effectively, used.

THE COMMON INFECTIOUS DISEASES. By H. Stanley Banks, M.A., M.D. (Glas.), F.R.C.P. (Lond.), D.P.H. (Cantab.), Physician-Superintendent, Park Hospital, Hither Green, London: Lecturer in Infectious Diseases, the Medical College, St. Bartholomew's Hospital, University of London; formerly Medical Superintendent, City of Leicester Isolation Hospital and Sanatorium, and Medical Officer of Health, Motherwell and Wishaw; Milroy Lecturer, Royal College of Physicians, London, 1945. Cloth. Pp. 354, with illustrations. Price $4.50. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, 1949.

This small and excellent book is based on lectures given by the author to both undergraduate and postgraduate students, and is intended as a supplement to clinical demonstrations and examinations. Epidemiology, bacteriology, symptomatology, diagnosis, prognosis, and treatment of all of the most common infectious diseases are discussed, in general and in detail. Also presented are topics of specific importance in particular diseases. Attention is given to new ideas, methods, and modifications of established procedures.

Informative data with applicability to several diseases are included with the discussion of the disease where they would most naturally arise, rather than relegated to a separate chapter of their own. They can be easily found through the index and are referred to in other pertinent discussions. In adopting this system, the author had in mind the undergraduate student, who would best profit by such a concrete approach.

Questions asked of the author by both undergraduates and postgraduates are answered as completely as possible. In general, Dr. Banks recommends that the medical student read the book for the general information contained therein, leaving the details to the perusal of the advanced physician.

MANUAL OF PHARMACEUTICAL LAW. By William Pettit, Lecturer in Pharmaceutical Jurisprudence, University of Pittsburgh. Cloth. Pp. 170. Price $2.75. The Macmillan Company, 60 Fifth Avenue, New York, 1949.

There is little in this manual that actually concerns the physician, except for discussions of prescribing for drug addicts, the liabilities of physician and pharmacist in the preparation of unusual prescriptions, and the legal status of a pharmacist practicing medicine, with a review of cases and court decisions. The Uniform Narcotic Drug Act is reprinted in its entirety; parts of sundry other Federal laws are also included, such as the Food, Drug, and Cosmetic Act, the Federal Narcotic Law, the Federal Public Health Service Act, and the Postal Law, which certainly might prove useful to have at hand.

The physician as a responsible citizen is in a position to protect his fellow citizens from many impositions perpetrated upon the public. His personal integrity, his knowledge of the law, and his scrupulous attention to law observance raises and/or maintains the ethics of those who deal with him.

MEDICAL STATE BOARD QUESTIONS AND ANSWERS. By R. Max Goepp, M.D., Formerly Professor of Clinical Medicine, Graduate School of the University of Pennsylvania, and Professor of Medicine, Woman's Medical College of Pennsylvania; and Harrison F. Flippin, M.D., Associate Professor of Medicine at the Graduate School of the University of Pennsylvania. Ed. 8. Cloth. Pp. 663. Price $7.00. W. B. Saunders Company, West Washington Square, Philadelphia, 1950.

This student standby was pretty badly in need of revision after 11 years. Adjustments to the present are the inclusion of the subject, psychiatry, and, of course, new antibiotics and drugs, and new therapeutic techniics. Everything seems to have been rewritten, except for anatomy. Both the table of contents and the index are full enough to be really serviceable in the use of the book. No claim is made that all questions it is possible to ask are covered. Nevertheless, the questions and answers included are adequate to form the basis of a thorough review.

ELECTROCARDIOGRAPHY. Fundamentals and Clinical Application. By Louis Wolff, M.D., Visiting Physician, Consultant in Cardiology and Chief of the Electrocardiographic Laboratory, Beth Israel Hospital; Associate in Medicine, Harvard Medical School. Cloth. Pp. 187, with illustrations. Price $4.50. W. B. Saunders Company, West Washington Square, Philadelphia, 1950.

The author presents a basic explanation of the electrical phenomena attendant upon muscle contraction and the application of these principles to the interpretation of oscillographic tracings through unipolar and standard limb leads. Avoidance of the evils of empiric interpretation of patterns routinely memorized is the chief aim.

A good share of his explanation is based on the Einthoven Equilateral Triangle Hypothesis, which is commonly currently accepted in this country. The last word on this matter has not yet been spoken. Full understanding of electrical phenomena in the human body still is in abeyance.

ANATOMY AND BALLET. By Celia Sparger, M.C.S.P., C.C.P.E., Consulting Physiotherapist to the Sadlers Wells School. Cloth. Pp. 80, with illustrations. Price $3.50. The Macmillan Company, 60 Fifth Avenue, New York, 1949.

Whereas formerly only carefully selected, physically perfect and gifted children were accepted for training in ballet, now teachers deal with large classes of children many of whom have minor physical variations for which allowance should be made and for which some understanding of the structure of the body is essential. This book provides a simple understanding of the bony structure of the body and the effects upon it of the movements which form the foundations of the dancing of ballet. It is well illustrated with photographs and x-ray reproductions.

While a handbook for teachers of ballet dancing may seem a far cry from the every day concerns of osteopathic physicians, probably quite a few physicians number dancers among their patients. This book is quite interesting in its emphasis on the normal functioning of the body, correct posture, and the care to be taken in development of young girls especially who are training for ballet. There is implicit a recognition of the importance of structural integrity which is entirely in accord with osteopathic principles.

Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Fourth Annual Meeting, Chicago, July 10-14, inclusive. Program Chairman, C. R. Nelson, Ottawa, Ill.

Academy of Applied Osteopathy, Stevens Hotel, Chicago, July 14, 15.

American Association of Osteopathic Colleges, Stevens Hotel, Chicago, July 7, 8

American College of Neuropsychiatrists, Macon, Mo., July 6-8.

American College of Osteopathic Internists, Continental Hotel, Kansas City, Mo., October 23-26. Program Chairman, Stuart Harkness, Des Moines, Iowa.

American College of Osteopathic Surgeons, Hotel Savery, Des Moines, Iowa, October 15-19. Program Chairman, Howard A. Graney, Des Moines, Iowa.

American Osteopathic Academy of Orthopedics, Hotel Savery, Des Moines, Iowa, October 15-19. Program Chairman, Harry F. Shaffer, Detroit.

American Osteopathic College of Radiology, Hotel Savery, Des Moines, Iowa, October 15-19; Board of Governors, October 11. Program Chairman, D. W. Hendrickson, Wichita, Kans.

American Osteopathic Hospital Association, Hotel Savery, Des Moines, Iowa, October 15-19. Program Chairman, Mr. Edward C. Barron, Detroit.

American Society of Osteopathic Anesthesiologists, Hotel Savery, Des Moines, Iowa, October 15-19. Program Chairman, Crawford M. Esterline, Kirksville, Mo.

Association of Osteopathic Publications, Stevens Hotel, Chicago, July 8.

Auxiliary to The American Osteopathic Association, Stevens Hotel, Chicago, July 10-14.

Canadian Osteopathic Association, international convention, General Brock Hotel, Niagara Falls, Ontario, October 19-21. Program Chairman, Norman W. Routledge, Chatham, Ontario.

Colorado: See Rocky Mountain Conference.

Kansas, annual convention, Allis Hotel, Wichita, October 1-4. Program Chairman, Irwin J. Conant, Meriden.

Kentucky, Brown Hotel, Louisville, October 5, 6. Program Chairman, Martha Garnett, Louisville.

Maine, annual meeting, Samoset Hotel, Rockland, June 29-July 1. Program Chairman, Marshall J. Gerrie, Pittsfield. Semi-annual meeting, Bangor, December.

Michigan, annual meeting, Civic Auditorium, Grand Rapids, October 2-5; House of Delegates, October 1, 2. Program Chairman, Ralph F. Kraker, Ann Arbor.

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Missouri, Jefferson Hotel, St. Louis, October 12-14. Program Chairman, Theodore Corcanges, Raytown.

New Mexico, El Rancho Hotel, Gallup, September 14-16. Program Chairman, William D. Andrews, Albuquerque.

New York, Hotel Marcy, Lake Placid, October 13, 14. Program Chairman, Charles K. Smith, Elmira.

Oklahoma, Biltmore Hotel, Oklahoma City, November 7-9. Program Chairman, Daniel B. Heffelfinger, Oklahoma City.

Osteopathic College of Ophthalmology and Otorhinolaryngology, Ambassador Hotel, Los Angeles, November 1-3. Board of Trustees of the College and American Osteopathic Board of Ophthalmology and Otolaryngology, October 30, 31. Program Chairman, Edward W. Davidson, Los Angeles.

Osteopathic Cranial Association, Stevens Hotel, Chicago, July 15, 16.

Osteopathic Women's National Association, Stevens Hotel, Chicago, July 10, 12.

Pennsylvania, annual meeting, Bellevue-Stratford Hotel, Philadelphia, September 22-24. Program Chairman, Charles M. Worrell, Palmyra.

Rocky Mountain Conference, Broadmoor Hotel, Colorado Springs, Colo., November 10-12.

Society of Divisional Secretaries, Stevens Hotel, Chicago, July 8.

Tennessee, Andrew Jackson Hotel, Nashville, October. Program Chairman, Richard Alexander, Greenback.

Vermont, Rutland, October 4, 5. Program Chairman, M. C. Smith, Bennington.

Western States Osteopathic Society of Proctology, Biltmore Hotel, Los Angeles, September 25-27. Program Chairman, Lee R. Borg, Los Angeles.

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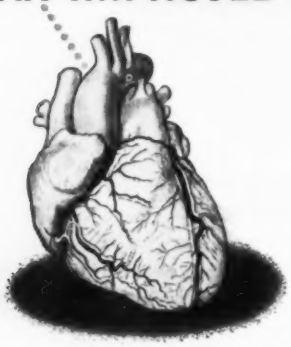

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*Morrison, L. M., and Gonzalez, W. F.: Results of Treatment of Coronary Arteriosclerosis with Choline, American Heart Journal 38:471, Sept., 1949.

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OFFICIAL AND AFFILIATED ORGANIZATIONS

ARKANSAS

State Society

The program at the annual meeting April 28-29 at the Albert Pike Hotel in Little Rock included "Glénard's Syndrome," "Sacroiliac Lesions," and "Posture Analysis, As Causes of Disease" presented by C. R. Nelson, Ottawa, Ill., and two films demonstrating osteopathic technic.

CALIFORNIA

Alameda County

A business meeting was held on April 13.

San Diego

Discussion of the state convention, and instructions to delegates were conducted by Edward Houghtaling, San Diego, at the meeting held on April 9 in San Diego.

San Gabriel Valley

A film entitled "Communicable Diseases," and a talk were presented by F. Kenneth Gates, M.D., at the meeting in San Marino, March 16.

San Jose

At the meeting held in San Jose on March 21, W. Ballentine Henley, president, COPS, was the speaker.

West Los Angeles

Representatives of other component societies met with the West Los Angeles Society on March 14, and again on April 11, to discuss problems that confront the membership of the California Osteopathic Association.

COLORADO

State Society

Included in the program of the annual meeting, held in Denver, April 29, were the following talks: "Endometriosis," C. Lloyd Peterson; "Water Balance in the Body," Louis Falkenburg; and "Cranial Approach to Cardiovascular-Renal Problems," Harold I. Magoun. All the speakers were from Denver.

Northern Colorado

A meeting was held in Greeley on April 14.

A meeting was scheduled to be held May 12 in Loveland.

FLORIDA

State Society

According to an advance announcement, the following were to be included in the program of the meeting to be held in Bradenton, May 14-16: "The Basis for the Spinal Etiology of Disease," "Clinical Implications of the Newer Concepts of the Osteopathic Lesion," and "Preventive Medicine of Tomorrow," Irvin M. Korr, Ph.D.; "Osteopathic Principles in General Practice," "Structural Diagnosis in General Practice," "Structural Problems of School Children Between the Ages of 5 and 13," and "Basic Principles for the Care of the Injured in Atomic Warfare," Wallace M. Pearson. Both speakers are from Kirksville, Mo.

Fifth District

A meeting was held in St. Petersburg on March 21.

St. Petersburg

Officers were listed in the May JOURNAL.

Committee chairmen are: Hospitals, George S. Rothmeyer; program, J. Brayton Cahill, and public relations, A. B. Patterson, all of St. Petersburg.

IDAHO

State Society

At the annual convention, Boise, May 19-20, the following talks were scheduled to be presented, according to an advance announcement: "The Dorsal Area," "Appendicular Technic," "Ventral Technic," "The Shoulder Girdle," Luceo Mossman, Portland, Ore.; and "Endocrinology: An Evaluation of Its Scope," "Endocrine Aspects of Cardiovascular Disease," "Thyroid, Differential Diagnosis with Reference to Therapeutic Possibilities," "Newer Concepts of Thyroid Therapy," Basil Harris, Los Angeles. Also to be presented were two films on hematology.

Boise Valley

Speakers at the March 23 meeting in Nampa were F. M. GeMeiner, Nampa; Claude R. Whittenberger, Caldwell; and D. W. Hughes, Boise.

Alice T. Strowd, Caldwell, spoke on "Osteopathy in Women's Diseases" at the meeting in Caldwell, April 20.

A meeting was scheduled to be held in June at Mountain Home.

ILLINOIS

Fifth District

Russell P. Armbruster, Pontiac, gave a talk and demonstration on "Poliomyelitis" at the meeting in Monticello, April 16.

Sixth District

A round table discussion and a demonstration by Homer W. Welch, Beardstown, were held at the March 16 meeting in Beardstown.

Seventh District

The trustee is Jacobine Kruze, Ottawa.

At the meeting in Ottawa, April 27, Harry L. Irish, Battle Creek, Mich., gave a demonstration of osteopathic manipulative technic.

The May meeting was scheduled to be held in Kankakee.

INDIANA
Fifth District

The officers are: President, Loran L. Taylor, Bloomington; secretary-treasurer, J. Wesley Elbert, Petersburg.

A talk on bacteriostatic drugs and a film on low-back problems were presented at the meeting, April 16, in Vincennes.

LOUISIANA
Southwest

The officers are: President, Carl E. Warden, Lake Charles; vice president and program chairman, Melbert R. Higgins, Lafayette; secretary-treasurer, A. E. Stanton (re-elected), Crowley.

MAINE
Knox-Lincoln-Waldo (Tri-County)

The officers are: President, Robert J. Meehan, Rockland; vice president, William H. Watson, Bath; secretary-treasurer, James P. Kent (re-elected), Rockland. The trustees are John J. Sinnett, Belfast, Paul D. Cushman, Boothbay Harbor, and Edwin L. Scarlott, Rockland.

MASSACHUSETTS
Connecticut Valley

At the April 18 meeting in Agawam, Paul M. Brose, Holyoke, spoke on "Technic." Dr. Brose and Ward C. Bryant of Greenfield discussed "Technic" at the meeting in Holyoke, May 9.

Middlesex South

Nelson D. King, Boston, spoke on "Pediatric Gynecology" at the April 13 meeting in Cambridge.

Mystic Valley

"Cardiac Emergencies" was the title of a talk given by H. Earle Beasley, Boston, at the April 5 meeting in Medford.

Southeastern (Fourth District)

The officers are: President, Thomas Berwick (re-elected); vice president, Ralph B. Parlin; secretary-treasurer, Clifford S. Parsons (re-elected). All are from New Bedford.

The trustee is William H. Niedner, Taunton.

MICHIGAN
Hospital Association

At the meeting in Lansing, April 23, Mr. Charles J. Chastang spoke on "Legal Problems in the Hospital" and Mr. Nelson G. Grills spoke on "Public Education and the Hospitals from a Legal Viewpoint."

Capitol

On April 4 a quarterly meeting was held in Lansing, at which time Miss Lucia Morgan, East Lansing, gave a talk on Negro folklore.

South Central

Herman F. Brandt, Ph.D., Hillsdale, addressed the March 23 meeting in Jackson. His topic was "Psychopathology and the Practice of Osteopathy."

Western

At the April 5 meeting in Muskegon, Roy G. Bubeck, Jr., Grand Rapids, discussed the medications used in obstetrics and gynecology.

MISSOURI
Central

Donald Siehl, Kirksville, was the principal speaker at the meeting April 20 in Louisiana.

Central Ozark

A meeting was held in Rolla on April 6. The next meeting was scheduled for May 4 in Crocker.

Jackson County

The officers are: President, Harold W. Witt; president-elect, Lee E. Davidson; vice president, Paul H. Potter; secretary-treasurer, Luther W. Swift. All are from Kansas City.

The trustee is Charles A. Povlovich, Kansas City, and the alternate trustee is Richard C. Sheck, Independence.

A meeting was held in Kansas City on March 21.

North Central

Mr. Robert M. Broadwell, Kirksville, spoke on "Clinical Pathology" at the meeting in Milan, March 16.

Northeast

At a meeting on April 13, in La Plata, Mr. Broadwell, the first speaker, described sugar tolerance tests which can be run in the average practitioner's office. The second speaker was Mr. August Kern, Jr., St. Louis, who discussed insurance problems confronting the profession.

Osage Valley

At the April 13 meeting in Jefferson City the principal speaker was Donald Siehl, Kirksville.

St. Louis

A film concerning the heart was shown at the April 18 meeting in St. Louis.

Southeast

A meeting was held at Sikeston on April 2.

West Central

Mr. August Kern, Jr., St. Louis, spoke at the meeting in Pleasant Hill on April 27.

NEW MEXICO
State Society

A meeting of the Board of Trustees took place in Albuquerque on April 2,

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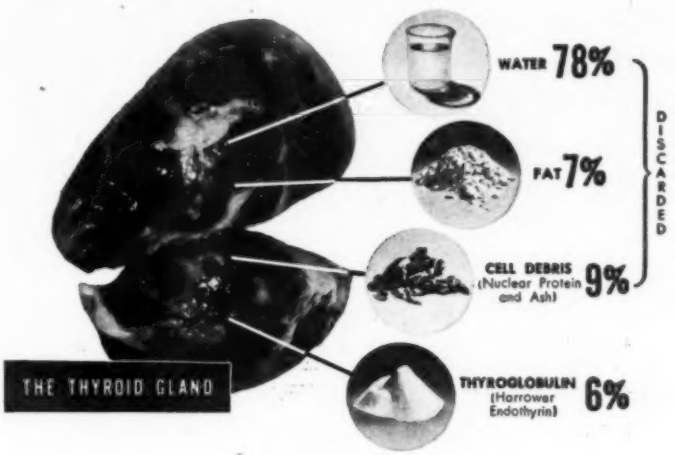

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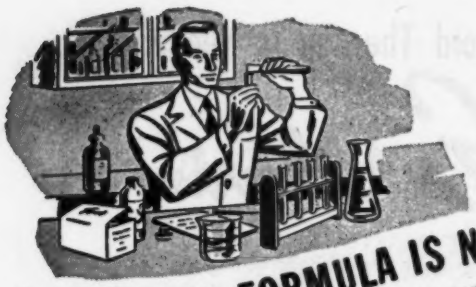

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The officers are: President, David J. Bachrach, New York; president-elect, George F. Johnson, Brooklyn; vice president, Sydney M. Kanev; secretary, Harold S. Goldberg (re-elected), and treasurer, Thomas W. Breese, all from New York.

The directors are Wilbur J. Kuhn, Woodhaven, and Omar C. Latimer and J. Marshall Hoag, New York.

At the April 19 meeting, C. Gorham Beckwith, Hudson, was scheduled to lecture on "The Physiology of the Treatment of the Still Lesion."

OHIO
Eleventh, Twelfth and Fifteenth District Academies
(Dayton-Springfield-Cincinnati)

A joint meeting was to be held in Dayton on April 16 for the purpose of reviewing the past progress of osteopathic education and outlining the plans for the future.

Fifteenth District Academy (Cincinnati)

The annual meeting was scheduled for April 13.

See also Eleventh, Twelfth and Fifteenth District Academies.

OKLAHOMA
Hospital Association

Speakers at the March 30 meeting in Oklahoma City were Mr. Walter L. Gray, Oklahoma City; Mr. Bryant, Hinton, and Mr. Bethel, Tulsa, who discussed insurance, hospital management, and public relations.

Kay-Osage

W. Guy Hudson, Ponca City, discussed "Bone Surgery" at the March 9 meeting in Pawhuska.

Oklahoma-Canadian

The officers are: President, Richard T. Almquist; vice president, Charles F. Muecke, both of Oklahoma City; secretary-treasurer, Ivan W. Berrey, Edmond.

The trustees are Daniel B. Heffelfinger and Leon K. Silvers, both of Oklahoma City.

At the April meeting in Oklahoma City, Frank J. Gasperich, Tulsa, spoke on "Electro-Shock Therapy."

Okmulgee County

The officers are: President, L. H. Tannehill (re-elected), Henryetta; and secretary-treasurer, W. W. Burnett (re-elected), Morris.

Tulsa

A meeting was held April 11.

OREGON
Willamette Valley

The officers are: President, George R. Drost, Corvallis; president-elect, Elmer Flaming, Dallas; and secretary-treasurer, James R. D. Little, Halsey.

RHODE ISLAND
State Society

H. Dale Pearson, Erie, Pa., spoke on professional problems at the April 5 meeting.

Providence County

The officers are: President, Keaim M. Kechijian, Pawtucket; vice president, Chester L. Handy; secretary, F. Chandler Dodge; and treasurer, Frederick F. Manchester, the latter three of Providence.

The trustees are Drs. Kechijian, Handy, Dodge, and Manchester, Charles H. Kershaw, and William H. Lum. The latter two are also from Providence.

Committee chairmen are: Membership, Hazel G. Axtell, Providence; ethics, Jane A. Holmes, Warren; hospitals, James T. Walsh; clinics, Francis W. Wetmore, both of Pawtucket; statistics, Joseph A. Marini, Westerly; convention program, Dr. Kershaw; convention arrangements, Barbara Rhodes; legislation, J. Francis Crowley, both of Pawtucket; vocational guidance, Alexander Pausley; public health, Eric A. Peterson, both of Providence; industrial and institutional service, Daniel L. Russo, Newport; public relations, Mark Tordoff, Providence, and social, Dr. Lum.

SOUTH DAKOTA
State Society

The annual convention was to meet June 4-6 in Custer. Principal speakers were scheduled to be E. F. Leininger, Des Moines, Iowa, discussing surgery, and William J. Huls, Davenport, Iowa, who was to talk about and demonstrate osteopathic technic.

State Society Auxiliary

The officers are: President, Mrs. William F. Kessler, Springfield; vice president, Mrs. L. H. Eske, Groton; and secretary-treasurer, Mrs. C. C. Pascale, Centerville.

South East District

Joseph J. Markine, Elkton, was to talk on child health and demonstrate osteopathic technic at the April 30 meeting in Sioux Falls.

TENNESSEE
West Tennessee

The officers are: President, H. F. Bower, Union City; president-elect and vice president, H. Perry Bynum, Memphis; and secretary-treasurer, B. C. DeVilbiss, (re-elected), Trenton.

Committee chairmen are: Membership, Walter L. Baker; ethics, Ernest R. Cleaves, both of Memphis; hospitals, Lewis Daniel Elliston, Covington; clinics, J. M. Moore, Jr., Trenton; statistics, C. L. Baker, Memphis; convention program and arrangements, L. Dale Chesemore, Paris; legislation, James A. Winn, Clarksville; vocational guidance, James A. Moore, Dyersburg; public health, Dr. Bynum; industrial and institutional service, Colin H. Threlkeld, Memphis; and public relations, Marion Edmund Coy, Jackson.

TEXAS
State Society Auxiliary

The officers are: President, Mrs. A. L. Garrison, Port Arthur; president-elect, Mrs. Merle Griffin, Corpus Christi; vice-president, Mrs. Robert B. Beyer, Fort Worth; and secretary-treasurer, Mrs. Elmer C. Baum, Austin.

Hospital Association

The officers are: President, Merle Griffin, Corpus Christi; and president-elect, Roy B. Fisher, Fort Worth.

District Three

H. G. Grainger, Tyler, spoke on "Interpretation of Common Neurologic Reflexes" at the March 19 meeting in Athens.

District Seven

A sound film on the nutritional care of the hospital patient was presented at the April 3 meeting by Mr. William Sherman.

WEST VIRGINIA
Monongahela Valley

"Shoulder Technic in Chronic Conditions" was the title of a talk given by Robert E. Coda, Morgantown, at the March 30 meeting in Clarksburg. Dr. Coda also gave a demonstration pertinent to his talk.

The next meeting was scheduled for June 29 in Kingwood.

WISCONSIN
State Society

The officers are: President, D. A. Farnum, Sheboygan; president-elect, J. S. Anderson, River Falls; vice president, R. C. Fischer, Stevens Point; and secretary-treasurer, Edwin J. Elton (re-elected), Wauwatosa.

The trustees are Clarence M. Scott, Eau Claire; A. V. Mattern, Green Bay; E. G. Anderson, Janesville, and Ray J. Dennis, Milwaukee.

The program for the annual convention in Milwaukee May 3-5 was to include, according to an advance announcement: "The Cranial Concept and Its Place in Practice," Paul E. Kimberly, Des Moines, Iowa; "X-Ray for the General Practitioner," Ray J. Dennis, Milwaukee; "The Application of the Respiratory Principle of Manipulation," Dr. Kimberly; and "Structural Therapy in Cardiac Conditions and Rheumatic Heart Disease," S. V. Robuck, Chicago.

Fox River Valley

At the meeting in Green Bay, April 13, H. Charles Hagmann, Sturgeon Bay, was to speak on "Appendicular Technic."

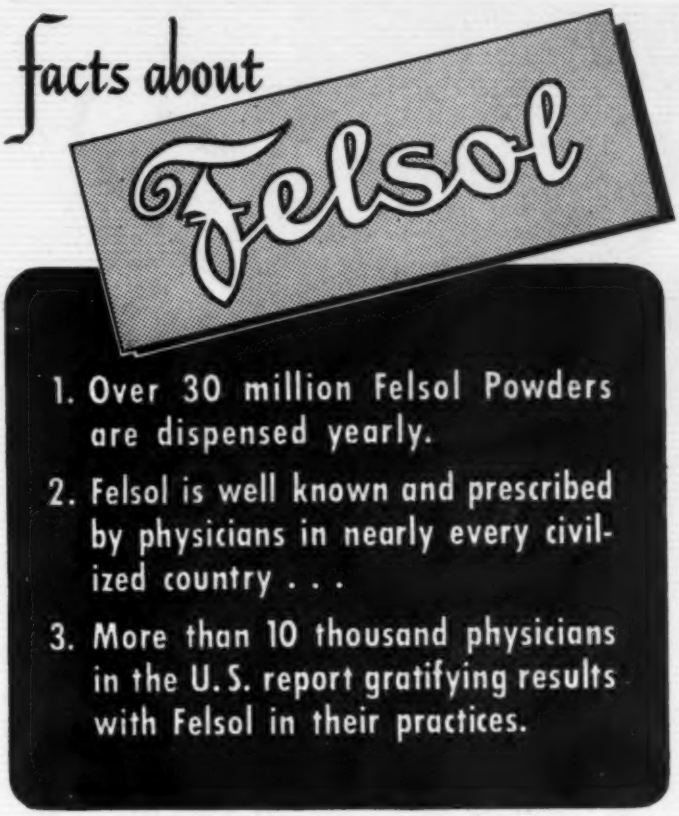
Milwaukee

A meeting was to take place June 1.

Northwest District

The officers were listed in the March JOURNAL.

The trustee is J. S. Anderson, River Falls.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A business meeting was held March 21.

SPECIAL AND SPECIALTY GROUPS

ACADEMY OF APPLIED OSTEOPATHY
Inland Empire

At the meeting in Moscow, Idaho, April 15, Paul E. Emmans, Spokane, Wash., gave a talk, with films, on "Diagnosis of Low-Back Pains"; Harry L. Davis, Walla Walla, Wash., talked on the treatment of acne; and H. L. Chadwick, Spokane, Wash., discussed a medicolegal case. A film, prepared by the Armour Laboratories, concerning hematology, was presented.

The next meeting was scheduled for May 13, to be held in Pasco, Wash.

Puget Sound

The following talks were to be given at the May 20 meeting in Seattle: a review of an article by Beryl E. Arbuckle, W. A. Newland, Seattle; a discussion of cranial technic, Thomas C. Herren, Kelso, Wash.; "Headache," Mary Eleanor Gillies; a review of an article by Leon E. Page, J. Lowell Kinslow; "Rectal Pathology," Scott B. Wisner, Jr.; and "Pediatrics," Joseph G. Aiken, all of Seattle.

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San Francisco Bay Area

F. O. Edwards, San Jose, Marion O. Moore, Los Gatos, and Charles W. Aldrich, Palo Alto, were to discuss pathology of the osteopathic lesion and the research of Stanley G. Bandeen on diabetes and osteopathy at the April 22 meeting in Niles.

AMERICAN OSTEOPATHIC SOCIETY OF PROCTOLOGY

The officers are: President, John M. Spencer, St. Joseph, Mo.; vice president, Marille E. Sparks, Dallas, Tex.; secretary-treasurer, Carl S. Stillman, Jr., San Diego, Calif.

The trustees are: Collin Brooke, St. Louis, Frank Stanton, Boston, R. Vance Toler, Shawnee, Okla., Lester Vick, Amarillo, Tex., George Russell Norton, Ft. Lauderdale, Fla., and Raymond Parker Perdue, Flint, Mich.

ILLINOIS OSTEOPATHIC SOCIETY OF RADIOLOGY

At the meeting to be held on May 11, in Chicago, an illustrated lecture, "Comminuted Disks," was to be presented by H. H. Halladay, Galesburg, and Harold W. Fitch, Bushnell.

MISSOURI OSTEOPATHIC SOCIETY OF RADIOLOGY

The first day of the April 30-May 1 meeting in St. Joseph was sponsored by this society. Charles J. Karibo, Detroit, was the principal speaker.

NORTHWEST OSTEOPATHIC CONFERENCE

According to an advance announcement of the June 5-8 meeting in Tacoma, Wash., the following were to be included in the program: A forum on osteopathic principles and practice in chronic disease, conducted by Paul K. Theobald, Oakland, Calif.; E. C. Darnall, Berkeley, Calif.; Harry L. Davis, Walla Walla, Wash.; Richard Sayre Koch, Olympia, Wash., and H. V. Hoover and Mary Alice Hoover, Tacoma, Wash.; a forum on osteopathic principles and practice in acute disease, conducted by the same doctors; and a forum on the cranial concept, conducted by Raleigh S. McVicker, The Dalles, Ore., and W. A. Newland, Seattle.

Several sessions on various aspects of practice in treatment were scheduled: Upper cervical area, Dwight D. Clarke, Colville, Wash.; spinal and sacral two-man technic, J. Lowell Kinslow and Alfred J. Walker, both of Seattle; lumbosacral area, Dr. Darnall; eye, Martin D. Young, Seattle; upper thoracic and lower cervical area, Perry C. Wilde, Seahurst, Wash.; midthoracic area, Luceo Mossman, Portland, Ore.; thoracolumbar area, Dr. Davis; upper appendage and related spinal areas, Dr. Theobald; cervical area, Richard E. Walstrom, Eugene, Ore.; treatment of lumbago, Dr. Young; vascular diseases of the lower extremity and foot, Eugene E. LaCroix, Seattle; lumbosacral technic, Dr. Davis; and upper thoracic technic, H. V. Hoover.

Frederic J. Guest, M.D., Regina, Saskatchewan, Canada, was to speak on "The Relationship of the Hospital to the General Practitioner"; a talk on the attitude of the labor unions toward health services was scheduled; several surgical round table conferences were to be held; and other talks scheduled were to be given by Herbert G. Bauer, Seattle, J. S. Denslow, Kirksville, Mo., Everett W. Pruett, Seattle, Stephen M. Pugh, Everett, Wash., and John P. Wood, Birmingham, Mich.

State and National Boards

ALABAMA

Examinations June 27-29. Address D. G. Gill, M.D., secretary, Board of Medical Examiners, 519 Dexter Ave, Montgomery 4.

COLORADO

Basic science examinations in September. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 3.

CONNECTICUT

Professional examinations July 11. Address H. Wesley Gorham, D.O., secretary, Osteopathic Examining Board, 520 West Avenue, Norwalk.

DELAWARE

Examinations July 11-13. Address Joseph McDaniel, M.D., secretary, Board of Medical Examiners, 229 S. State Street, Dover.

FLORIDA

Professional examinations June 24 and 25 in St. Petersburg. Address Richard S. Berry, D.O., secretary, Board of Osteopathic Medical Examiners, P. O. Box 124, Station "A," St. Petersburg.

GEORGIA

Examinations July 4, in Atlanta. Address R. E. Andrews, D.O., secretary, Board of Osteopathic Examiners, 304 First National Bank Building, Atlanta.

HAWAII

Examinations July 12. Address Mabel A. Runyan, D.O., secretary, Board of Osteopathic Examiners, 2333 C. Kalakaua Avenue, Honolulu 30.

IOWA

Basic science examinations August 8 in Des Moines. Address Ben H. Peterson, Ph.D., Coe College, Cedar Rapids.

MASSACHUSETTS

Examinations July 11. Address George Schadt, M.D., secretary, Board of Registration in Medicine, State House, Boston 33.

MICHIGAN

Professional examinations June 27-29. Address Harry F. Schaffer, D.O., secretary, Board of Osteopathic Registration and Examination, 1375 Penobscot Building, Detroit 26.

MINNESOTA

Professional examinations September 12. Address George F. Miller, D.O., secretary, Board of Osteopathic Examiners, 601 Dayton Avenue, St. Paul 2.

MISSISSIPPI

Professional examinations June 20-21 in Jackson, at the Edwards Hotel. Address R. N. Whitfield, M.D., assistant secretary, Board of Health, Jackson 113.

MONTANA

Examinations in September. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

NEVADA

Examinations July 11. Address Walter J. Walker, D.O., secretary, Board of Osteopathic Examiners, 210 W. Second St., Reno.

NEW HAMPSHIRE

Examinations September 14-15 in Concord. Address John S. Wheeler, M.D., secretary, Board of Registration in Medicine, State House, Concord.

NEW MEXICO

Basic science examinations August 6. Address Miss Marguerite Kilkenny, Assistant Secretary of State, c/o Office of Secretary of State, Santa Fe.

NORTH CAROLINA

Examinations in Raleigh July 7-8. Applications must be received by June 20. Address Frank R. Heine, D.O., secretary, 926 Southeastern Building, Greensboro.

NORTH DAKOTA

Examinations July 4. Address M. M. Kemble, D.O., secretary, Board of Osteopathic Examiners, 6-10 Kresge Block, Minot.

OREGON

Professional examinations in July. Address Mr. Howard I. Bobbitt, executive secretary, 608 Failing Bldg., Portland.

Basic science examinations September 9. Address Charles D. Byrne, Ph.D., secretary, Board of Higher Education, Eugene.

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Professional examinations in July in Nashville. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland Avenue, Jackson.

Basic science examinations July 7, 8 in Memphis. Address O. W. Hyman, M.D., secretary, Board of Basic Science Examiners, 874 Union Avenue, Memphis.

TEXAS

Professional examinations June 19-21 in Austin. Address M. H. Crabb, M.D., secretary, Board of Medical Examiners, 1714 Medical Arts Building, Fort Worth 2.

WASHINGTON

Professional examinations in July. Address Mr. George C. Starlund, acting director, Department of Licenses, Olympia.

Basic science examinations in July in Seattle. Applications should be filed 30 days prior to examination, but will be accepted up to 15 days before examination. Address Mr. Edward C. Dohm, Department of Licenses, Olympia.

WISCONSIN

Professional examinations June 27 at Milwaukee. Address C. A. Dawson, M.D., secretary, Board of Medical Examiners, River Falls.

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Examinations in September. Address G. B. Taylor, acting registrar, Office of the Registrar, University of Alberta, Edmonton.

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July 1—within period of 60 days following—Indiana, $5.00 for residents; $10.00 for non-residents. Address Paul R. Tindall, M.D., secretary, Board of Medical Registration and Examination, 20 N. Pike St., Shelbyville.

July 1—Kansas, $5.00. Address Forrest H. Kendall, D.O., secretary, Board of Osteopathic Examination and Registration, 420½ Pennsylvania, Holton.

July 1—Michigan, $5.00. Address Harry F. Schaffer, D.O., secretary, Board of Osteopathic Registration and Examination, 1375 Penobscot Bldg., Detroit 26.

July 1—North Dakota, $3.00. Address M. M. Kemble, D.O., secretary, Board of Osteopathic Examiners, 6-10 Kresge Block, Minot.

July 1—Oklahoma, $2.00. Address Kendall E. Rogers, D.O., secretary, Board of Osteopathy, 804 First National Bank Bldg., Oklahoma City, 2.

July 1—Tennessee, $5.00 to the State Licensing Board for the Healing Arts, and $1.00 to the Osteopathic Board. Both fees are payable to M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland Ave., Jackson.

August 1—New Mexico, $3.00. Address H. E. Donovan, D.O., secretary, Board of Osteopathic Examination and Registration, Donovan Osteopathic Clinic and Hospital, Raton.

EXAMINATIONS BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary, and the completed application blank, together with a passport photograph and check for the part or parts to be taken, must be in the Secretary's office by the November 15, or April 15 preceding examination. Part III of the examination will be given in specific locations at the discretion of the Board for the convenience of the applicant.

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CHEMICALS INTRODUCED IN THE PROCESSING OF FOODS*

Franklin C. Bing, Ph.D., F.A.P.H.A.
Consultant to the Food and Pharmaceutical Industries; Lecturer in Physiology, Northwestern University, School of Medicine, Chicago, Ill.

The processing of foodstuffs for dietary purposes involves chiefly physical treatment, such as the trimming, cutting, and cleaning of vegetables, the butchering of meats and the application of heat or cold to foods of either plant or animal origin. From early days, however, man has made use of available technologic aids to help in the preservation of foods. Salt, flavoring materials and spices have long been used for the purpose of enhancing the flavor of food articles. At times in the past, some of the ingredients employed for the preservation of foods, or for the improvement of their acceptability to consumers, have been found to be contrary to the public interest. While the main protection to consumers has been, and will continue to be, the reliability of food manufacturers and their awareness of possible health hazards, there have also been enacted laws to protect the public. The federal law and the laws of every state prohibit the incorporation of harmful or deleterious substances in foods.

In recent years a considerable number of new chemicals have been brought to the attention of food processors and manufacturers. In many instances, it is questionable whether existing knowledge of the metabolic processes of nutrition is sufficiently extensive to warrant scientific approval of the use of some of the ingredients which have been incorporated in foods. The question arises whether the public needs greater health protection than now is afforded. The present article is a brief account of some of the substances introduced purposely in the processing of foods, from the viewpoint of their effect on consumers, in an attempt to answer this question. Traces of substances may be introduced inadvertently during processing or during storage or the preparation of foods for consumption; but the present report is concerned only with substances which are knowingly added to foods.

The substances purposely incorporated in foods during processing are included for nutritional or functional reasons, or both. The distinction in purpose may best be explained by examples.

The chemicals added to foods to enhance their nutritive value include all the vitamins and minerals of the well recognized enrichment and fortification programs. Such are the iodization of table salt, the fortification of margarine with vitamin A, the fortification of milk and evaporated milk with vitamin D, and the enrichment of flour and bread with thiamine, riboflavin, niacin, and assimilable iron preparations. Programs have also been worked out for the nutritional improvement, by vitamin and mineral additions, of corn meal and corn products, rice, and prepared breakfast cereal foods. The fortification and enrichment of foods with vitamins and minerals represent programs for nutritional improvement of important foods in accordance with modern knowledge of dietary requirements for health. They have been developed by the food industry with the guidance of nutrition experts and the sympathetic cooperation of government and industry.

The iodide added to table salt has been cited as an example of a chemical substance added to a food product for nutritional reasons. Usually potassium iodide is the iodine preparation employed for this purpose. Traces of thiosulfate may be added also, in order to stabilize the iodine content of the salt; in fact, unless such a stabilizer is incorporated in the salt it is quite likely that the iodine content of the table salt will be greatly reduced on storage. Such stabilizers, then, represent substances added for functional reasons. The tricalcium phosphate added to table salt to confer "free-running" properties represents another functional ingredient.

In general, functional ingredients are those which may be incorporated in the processing of foods for definite reasons, either to facilitate manufacturing processes or to confer some property to the

*Presented before the Food and Nutrition Section of the American Public Health Association at the Seventy-seventh Annual Meeting in New York, N. Y., October 25, 1949. Reprinted by permission from the *American Journal of Public Health*, February, 1950

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NUTRITIONAL EFFECTS OF SOME INGREDIENTS ADDED FOR FUNCTIONAL PURPOSES

Improvement in the nutritive value of foods is often a happy corollary to the use of substances added primarily for their functional value. The various calcium salts afford an interesting example. For the "hot biscuit" section of the country, phosphated flour has long been available. This is flour with added monocalcium phosphate. The purpose of the calcium salt is to correct for possible excessive use of baking soda in the preparation of sour milk biscuits. Calcium monophosphate is a common acidifying salt in self-rising flour and prepared pancake mixes. Tricalcium phosphate has been shown to be a useful inhibitor of caking in powdered sugar, although for this purpose starch is more commonly employed. The nutritional value of calcium salts in baking powders which contain them has been emphasized by Melnick, Oser, and Hockberg. Calcium acid phosphate may be used in bread production as an acidifying agent to correct for high pH of the water used in baking, or as an inhibitor of rope and mold. For the latter purpose, other calcium salts, such as calcium propionate, are similarly employed. Calcium salts are used in the formulation of so-called yeast foods for commercial bakers. The use of calcium salts as firming agents in the production of canned tomatoes and canned potatoes is a recognized procedure, permitted in the standards for these products. In every instance the calcium salt not only serves a useful purpose but also increases the nutritive value of the food to the extent to which it contributes additional calcium.

A recent survey of the calcium content of commercial white pan bread made throughout the United States showed that it amounted to, on the average, 401 mg. of calcium to the lb. Milk products accounted for much of this calcium, but calcium salts included for functional purposes also contributed. Tables of food composition, based on analyses of bread made some years ago, indicate much lower calcium figures.

Statistics of the Bureau of Commerce reveal that the consumption of monocalcium phosphate in 1948 amounted to more than 72 million lbs., or almost 0.5 lb. per capita. Nearly all of this calcium salt was used for food purposes. The quantity involved is sufficient to supply at least 20 per cent of the average person's daily dietary allowance for calcium, assuming of course equitable distribution.

ASCORBIC ACID

Because of its chemical properties, ascorbic acid has been found to be useful in the prevention of browning in some cut fruits, notably peaches. Frozen sliced peaches, the fresh fruit color of which has been stabilized through the addition of ascorbic acid, contribute additional small amounts of vitamin C to the diet. The amount used is about 150 mg. of ascorbic acid per lb. of frozen fruit.

SODIUM CHLORIDE AND SALT SUBSTITUTES

Salt as an ingredient of processed foods is receiving considerable attention among physicians and dietitians because of the interest in low-sodium diets in the treatment of hypertension and other disease conditions. Sodium chloride is a dietary essential and, while low intakes are necessary for persons with certain disease conditions, increased intakes are indicated for individuals with some other diseases and for healthy persons who are subjected to environmental conditions which induce profuse sweating, with a consequent excessive loss of salt through the skin. Salt under ordinary circumstances is a condiment. Most people salt their foods to make them more palatable. It is customary to use salt both in domestic and commercial preparation of foods, the amounts being dictated primarily by considerations of flavor. To meet the needs of patients on salt-free or, as they are better termed, low-sodium diets, special preparations have been formulated such as canned, water-packed vegetables and salt-free bread.

An interesting development in connection with the use of low-sodium foods has been the formulation of salt substitutes which impart some degree of salty flavor to foods, but which contain no sodium. Potassium salts have met with some acceptance for this purpose. It is

now clear that lithium chloride is unsuitable as a salt substitute.

It is unfortunate that, only after several deaths had occurred among patients using a lithium-containing salt substitute, lithium chloride was recognized as toxic under the conditions of its use in low-sodium diets. Had lithium chloride been considered as a drug, it could not have been sold for therapeutic purposes until its safety had been established by adequate experimentation under controlled conditions. As a "salt substitute," however, the new drug provisions of the Food, Drug and Cosmetic Act were not invoked.

It does not seem to be generally realized that new chemicals, intended for use in foods (unless conclusively known to be fraudulent) can be prohibited from interstate commerce only if their toxicity, or deleterious nature, if any, is demonstrated. Evidence of harmful properties must be substantial to hold up in court. The burden of proof rests on the government, in this case the Food and Drug Administration. Obviously, the time required to obtain conclusive information about some proposed ingredients may mean that considerable damage has been done before the situation is brought under control. It may be conceded that firms selling chemicals for use in foods are acting in good faith, on the basis of judgment which they as businessmen consider competent, but it is a fact well known to scientists that the results of preliminary tests may not be borne out by more extensive and intensive investigation. It should be recognized also that much more evidence will doubtless be necessary to demonstrate the harmlessness of some ingredients of foods than is needed to indicate the uses and limitations of a new drug.

CHEMICALS WHICH REQUIRE CONSIDERATION

Among the chemicals introduced in foods for functional purposes are the wetting agents, emulsifiers, stabilizers, so-called food improvers and preservatives, antioxidants for fats, and so on. Many of these substances are foreign to natural foods and little may be known about their behavior in the body. Not only may some of the substances suggested for functional reasons in food preparation be potentially hazardous in themselves, but the use of some of them also involves changes in the nature and nutritive quality of our foods which may not be recognized by consumers or even by those concerned professionally with matters of public health.

Many years ago Dr. H. W. Wiley and his collaborators in the Bureau of Chemistry of the U. S. Department of Agriculture reported elaborate studies of the influence of food preservatives on digestion and health. As a result of these investigations, which still serve as models of thoroughness, and the investigations of the so-called Remsen Boards, the use as food preservatives of boric acid and borax, salicylic acid and salicylates, sulfurous acid and sulfites, benzoic acid and benzoates, and formaldehyde, were prohibited entirely or, in the case of benzoates, and sulfur dioxide and sulfites, permitted in certain foods under rigidly specified limitations.

Because of the opinion which has been expressed in some quarters, and which no doubt has a modicum of truth, that government restrictions may act as a deterrent to progress in food technology, it may not be amiss to consider the effect of the ban of the use of formaldehyde as a preservative, say, in milk. Today there is everywhere available fresh milk, pasteurized and safe to drink, as nutritious as it is palatable, which keeps sweet for many days under conditions of ordinary refrigeration in the home. To bring this about has required a great deal of investigation and work by the dairy and allied industries, but the result has been a product of which industry, health authorities, and food regulatory officials may justly be proud. How much of this program would have been possible if, in the early days of pasteurization at the close of the 19th century, small amounts of formaldehyde had been tolerated as a functional ingredient of milk?

Today we are confronted with other problems, some of which are no doubt just as difficult of solution now as were the questions posed by certain food preservatives 45 or more years ago. A few illustrations of questions recently

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considered by food regulatory officials may point up the problem which confronts all those interested in the maintenance of the integrity of our food supply.

MONOCHLORACETIC ACID AS A PRESERVATIVE OR STABILIZER

Monochloracetic acid, a white solid synthesized in the laboratory many years ago, first came to attention as an inhibitor of bacterial action in food products as a result of work done in Europe, for which a French patent was issued in 1933. Tests by members of the food and chemical industries showed its potential usefulness in the preparation of certain fruit juices, soft drinks, beer and wine. As little as 0.05 per cent or less of monochloracetic acid as an ingredient would permit effective pasteurization at lower temperatures, avoiding thereby discoloration or the formation of turbidity, and giving the beverage a crystal clear or sparkling appearance. Tests by competent pharmacologists, which were reported in the scientific literature, seemed to show conclusively that the monochloracetic acid in the concentrations which were commercially useful, is harmless "even in continued daily ingestion by infants."

Later studies in other laboratories showed that monochloracetic acid is very irritating to the gastrointestinal tract and acts to inhibit respiration of tissue cells. In the light of the other favorable reports, however, these reports of unfavorable effects may not have seemed to be conclusive; at any rate monochloracetic acid was offered for sale to the food processing industries, and it was used for its functional value in the production of beer, wine, and other products. During the war, however, large numbers of soldiers in a southern camp exhibited severe gastrointestinal distress, with nausea and vomiting. Study revealed that the condition was caused by the consumption of beverages which had been "stabilized" with monochloracetic acid. Apparently this evidence, coupled with the reports of other laboratory studies, was conclusive enough for the courts to accept. Hundreds of thousands of dollars worth of beer was ordered to be destroyed because it contained monochloracetic acid. An even greater quantity, in money value, of wine had to be destroyed, and it is said that some smaller wineries were obliged to go out of business because of the loss of an entire year's output. Through such activity, the food processing and beverage industries have learned that monochloracetic acid is not suitable for use as an ingredient of articles offered for sale to the public. Can the conclusion be drawn that it would be better to require adequate testing of any new ingredient intended for use in food products before it is used, rather than afterward?

THIOUREA

In 1933, there were published reports that thiourea, a substance found to be effective in 1926 for the stimulation of growth of potato shoots, would prevent the browning of cut fruits exposed to the air. This was before the effectiveness of ascorbic acid for this purpose in some products had been shown. Two American patents covering the use of thiourea for the prevention of browning of cut sections of apples, pears, and peaches were issued in 1937 and in 1943. There were published several reports from the laboratories of the corporation to whom the patents had been assigned, to show the harmlessness of thiourea. But in 1941, three investigators at Johns Hopkins University studied the effect of thiourea on the thyroid glands of experimental animals. Thiourea was found to have a depressive effect on the thyroid, inhibiting the production of thyroxin. Further studies in several laboratories amply verified this observation, and also showed beyond question that thiourea is a dangerous substance which has no place in foods. Yet in 1946, the Food and Drug Administration made several seizures of frozen peaches which contained hazardous quantities of this ingredient, about 45 p.p.m. of thiourea. When fed to adult rats, so that the quantity of thiourea consumed was about 1 mg., the animals died overnight and, on autopsy their lungs were found to be filled with a watery exudate. Relatively small doses of thiourea are poisonous to all animals to which the material has been given. The use of this substance for medicinal purposes, as in the treatment of hyperthyroidism, is outside the scope of present considerations.

Because of its therapeutic usefulness, or the usefulness of some related compounds, thiourea has received considerable study. It is now known that long continued ingestion of thiourea by experimental animals results in a high incidence of thyroid hyperplasia with the development of adenomata. The occurrence of tumors in the liver has been reported when animals have been given amounts of thiourea that may be below those necessary to cause marked hyperplasia of the thyroid.

In the food technology literature one may find reports that thiourea is capable of stabilizing vitamin C, preventing loss of ascorbic acid in solutions, and retarding the development of rancidity in dried milk formulations such as are used in infant feeding. Thiourea has been found to prevent the development of mold in wheat of high moisture content, and the investigators who observed this effect were cautious enough to test the effect of thiourea on the germination of the wheat. In the concentrations employed they reported that the effect on wheat germination was negligible. Three reports over a period of years have demonstrated that the dipping of oranges in solutions of thiourea has a striking effect in preventing stem-end rot and decay by the blue and the green molds, but traces of thiourea remain in the rind and, in a relatively short time, appear in the juice of the oranges. The technologic details for the most efficient method of treating oranges with thiourea have been worked out and reported, but it is hardly likely that they will be put into operation. Nor is it likely that homemakers or manufacturers will follow the implied suggestions published, and later retracted, by one of the government agencies on the use of thiourea in the preparation of frozen peaches.

NITROGEN TRICHLORIDE

Nitrogen trichloride is a gas with which few students of chemistry in our schools and colleges have an opportunity to become acquainted in the laboratory, but which until recently has had intimate contact with most of the breadstuffs which everyone eats. Introduced to American millers from Europe about twenty-five or thirty years ago as a substance for the artificial maturing of flour, nitrogen trichloride soon reached the forefront of chemical agents for the rapid improvement in baking properties of either bakery or family flour from freshly milled wheat. It was recognized by the Food and Drug Administration as a suitable bleaching (and maturing) agent for flour. It must be conceded that the evidence in support of the harmlessness of this treatment of flour had appeared to be adequate, and today there is no indication whatever of any harm to human beings from the consumption of nitrogen trichloride treated flour or its baked products.

Late in the year 1946, however, Sir Edward Mellanby reported that flour treated with nitrogen trichloride, when incorporated with milk and suitable vitamin and mineral supplements in a diet adequate for the growth of puppies, or the maintenance of older dogs, produced a pathological condition in the dogs known among veterinarians as canine hysteria, running fits, or fright disease. It is a nervous disorder that can be cured if it has not progressed too far, by changing to unbleached flour or to flour which has been treated with other recognized bleaching and maturing agents. Within a few weeks, Mellanby's report had been verified and extended as the result of several independent studies in the United States. It was found that other species of animals, the cat, rabbit, rat, monkey, and ferret, showed central nervous system disorders when fed large amounts of flour heavily treated with nitrogen trichloride. Feeding tests with human volunteers were negative, even though competent investigators looked for disturbances with all the facilities of modern medicine at their disposal.

There has been no nitrogen-trichloride-treated flour permitted on the market since August 7, 1949, and even before that time the use of this agent had diminished to nearly the vanishing point. Its disappearance resulted from the voluntary action of American millers who, in effect, asked for the elimination of nitrogen trichloride from the standards for bleached flour and the substitution of chlorine dioxide as a suitable bleaching and maturing agent. Experiments showed no deleterious effects from the feeding of flour treated with this latter agent. As a result of such evidence presented at a public hearing, the Food and Drug Administration revised the standard for bleached flour.

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as a result of the nitrogen trichloride incident emphasized the relative paucity of knowledge as to the mechanism of the action of artificial maturing agents on flour. There are a number of countries where chemical bleaching or maturing of flour has been prohibited for one reason or another, and the physical characteristics of the bread in these countries are different from those of ordinary American white pan bread. Perhaps the fact that artificial bleaching and maturing agents and oxidizing agents have been recognized in the United States is an example of how progress, say along the lines of improving baking quality of flour by the application of heat, has been retarded. This is a subject that could well be explored thoroughly by the milling and baking industries. The per capita consumption of wheat flour has declined considerably from what it was before the use of bleaching and maturing agents came to be common in the milling industry, and oxidizing agents (which have much the same functional value as the maturing agents) came to be used in the baking industry. There have been many conjectures about the possible causes of this phenomenon of declining consumption. There is no more proof of the validity of any of these suppositions than there is that the effects produced by chemical treatment of the flour or dough may be responsible, in some degree at least.

MINERAL OIL

Mineral oil is not absorbed, except possibly in minute traces, from the digestive tract, and it has no food value. It is used medicinally, as a mild cathartic. In foods, it has been used for fraudulent purposes, as a substitute for food oils or fats without label declaration, or it has been incorporated in salad oils and dressings, and in mayonnaise, with labeling of the products as foods of particular usefulness in dietary caloric or fat restriction. The sale of foods containing mineral oil is considered illegal, even if the label declares the presence of mineral oil, because the courts have held such preparations to be deleterious. There is ample reason to support this stand, for the ingestion of mineral oil with other foods, as is inevitable when mineral oil is incorporated in such foods, results in the excretion of excessive amounts of some of the fat-soluble vitamins, which are soluble in the mineral oil and carried with it out of the body. The food factors capable of being lost in this manner are carotene, vitamin D (with a consequent disturbance of the metabolism of calcium and phosphorus), vitamin K, and no doubt other substances of importance.

During World War II days, and afterward when the supply of fats was short, there may have been a temptation to substitute mineral oil for food oils. Violations of the prohibition against the use of mineral oil in food have been recorded in instances involving popcorn, salad oils and dressings, mayonnaise, and a few other food products.

OTHER INGREDIENTS AGAINST WHICH REGULATORY ACTION HAS BEEN TAKEN

An examination of the notices of judgment published lately shows several other instances where an alert Food and Drug Administration has brought action in the interest of public health. Saccharin, a product with an interesting history, has been found as a substitute for part of the sugar in soft drink beverages and other foods. Fluorides have been found in beer, where they have been included for preservative properties. Quaternary ammonium compounds have been found in a few other foods, in which it appears either as a contaminant from the use of this material in sanitizing apparatus or as an added preservative. Surely all would agree that action to prevent such abuses is highly commendable. With a limited number of federal food inspectors, however, one wonders how many other instances are not recognized, and one wonders also how well abuses which do not involve products sold in interstate commerce are taken care of.

INGREDIENTS OF DOUBTFUL SIGNIFICANCE

There are a number of chemicals being offered for sale to food manufacturers, about the safety to health of which little is known. Parahydroxyben-

zoic acid, first used in Europe, is being offered to food manufacturers as a preservative in place of benzoic acid. There is a patent covering a process for the treatment of flour with diluted nitric acid; an orange colored product is obtained as one would expect in recalling the xanthoproteic reaction as a test for proteins. When dried and mixed with ordinary flour to the extent of 2 per cent, and with the addition of a little soya flour and lecithin, the resulting preparation has been offered for sale to bakers. The function of this preparation is to convey a deep yellow color, similar to that produced by egg yolks, so that a bun or sweet roll has a better consumer acceptance, at least as far as appearance of the article is concerned. The effects on human beings of eating products containing this nitric-acid treated flour are unknown.

The trade journals of the food processing industries almost regularly contain announcements of new chemicals which reputedly have a functional value in certain processed foods. Advertising literature, samples, and demonstrations may help convince a businessman that a particular chemical has merit. If the processed food under consideration is not one of the relatively few for which definitions and standards of identity have been established by the Food and Drug Administration, then the businessman is in a position to take a considered risk and use the ingredient. The competency of the manufacturer and the wisdom of his scientific advisers may afford just about all the protection the consumer receives in some instances. If used the chances are excellent that consumers and health officers will be unaware of the nature of the new ingredient.

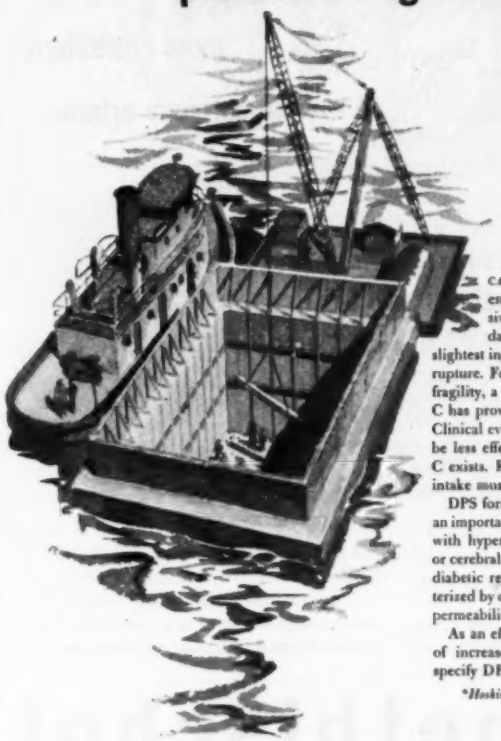
EMULSIFYING AGENTS IN BREAD AND OTHER FOODS

Beginning November 30, 1948, the Federal Security Administration reopened a public hearing for the purpose of receiving information which would enable the Administrator to develop a definition and standard of identity of bread and bread-like buns and rolls. This hearing was concluded on September 20, 1949. Although there were some recesses during the course of this reopened hearing, the taking of testimony covered more than 100 days, and the transcript of the record covers thousands of pages. This would seem like a great deal of testimony about the ingredients of a food item such as bread, but much of the record is devoted to testimony about certain chemicals which were unknown in the baking industry prior to 1946 or 1947.

Among the proposed ingredients for inclusion in the standard are the surface active agents sometimes designated as "bread softeners." One of these compounds, or mixtures of substances, which conveys to the finished baked loaf properties which some bakers have testified they liked, is polyoxyethylene monostearate. This is not a pure chemical compound, but a mixture of substances produced in the polymerization of ethylene oxide, or of ethylene glycol, depending on the method of manufacture, followed by esterification with a fatty acid, which may be commercial stearic acid. It is conceded by the manufacturers that only about 40 per cent of the molecule (the fatty acid portion) has possible food value; the polyoxyethylene portion is excreted partly by way of the intestines and partly by way of the kidneys. It is not established that none of the polymerized oxyethylene moiety remains in the tissues of the body. Evidence of the possible toxicity of this substance is conflicting. It has been recommended for use by bread bakers to the extent of ½ lb. to each 100 lbs. of flour; more has been used, and less has been suggested. It has been found that this material precipitates the amylose fraction of wheat starch, leaving an excess of the amylopectin fraction in the bread. The bread has an unusual softness when removed from the oven, probably because of the alteration of its structure. There is evidence that such bread stales at the same rate as bread which does not contain the softener, but it remains measurably softer to squeezing throughout the normal shelf-life of the bread.

The so-called emulsifiers or surface active agents are being used, it is reported, in commercial cake as well as in some prepared cake mixes, in salad dressings and mayonnaise, in ice cream, and in many other products. The first commercial product in the cake field seems to have been developed during World War II as a substitute for eggs, which were in short supply. Eggs, in addition to their nutritive value, have a functional value in cake batters; the lecithin of the egg yolk is a fairly efficient emulsifying agent because it is soluble in fats and in water.

protection against pressure



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*Haskins, H. W.: Rutin, Amer. Druggist 115:98 June 1947

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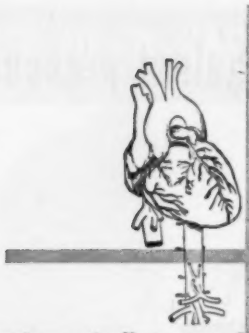

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Casimir Funk Labs., Inc. (affiliate) • 250 East 43rd St. • New York 17, N. Y.

1. Morrison, L. M. and Johnson, K. D.: Amer. Heart J. 39:31, Jan. 1950.
2. Herrmann, G. R.: Exp. Med. & Surg. 5:149, May-Aug. 1947.
3. Leinwand, I. and Moore, D. H.: Amer. Heart J. 33:3, Sept. 1949.
4. Felch, W. C.: N. Y. Med. 5:16, Oct. 20, 1949.
5. Morrison, L. and Gonzales, W. F.: Amer. Heart J. 38:471, Sept. 1949.

Apart from the question of possible harmful or deleterious effects of some of these substances, there is a nutritional question involved in their use. Should the inclusion of the newer emulsifying or surface active agents in foods encourage or permit the replacement of appreciable amounts of ingredients such as milk, butter, eggs and shortening in processed foods, there is the possibility that the nature and nutritive quality of our dietary may be significantly altered without the knowledge of consumers or the awareness of persons interested in public health.

CONCLUSIONS

The use of chemicals in the processing or formulation of many foods is increasing. In many instances the use of certain substances as ingredients of processed foods raises grave questions of the effect of their use on the nutritive quality of our diet, and on the health of consumers. While the present Food, Drug and Cosmetic Act affords considerable protection, to manufacturers as well as to the public, there is insufficient protection offered in the case of products for which definitions and standards of identity have not been promulgated. A considerable improvement would be provided if the Federal Food, Drug and Cosmetic Act were amended to require the same unbiased consideration, and approval prior to their use, of new substances intended for foods as the present law now extends to new drugs.

MARKED DECREASE IN ACCIDENTS IN 1949*

The accident record for our country in 1949 presents a generally encouraging picture. On the basis of data now available, it seems probable that the accident toll for the year was about 92,000 lives. This number is not only well below the 98,000 killed in 1948, but is also the lowest for any year in a decade. Moreover, in relation to population, the mortality from accidents in 1949 was the lowest on record in the United States.

Each of the main classes of accidents took fewer lives in 1949 than in the preceding year. Injuries in and about the home accounted for approximately 33,000 lives, or about 2,000 less than in 1948, but were again responsible for a larger number of fatalities than any other class of accidents. Occupational fatalities, too, recorded a sharp decline. Accidents in public places, exclusive of those in which a motor vehicle was involved, took about 2,000 fewer lives in 1949 than in 1948, the number of deaths from such mishaps dropping to about 15,000. Motor vehicle fatalities fell somewhat below the total of 32,000 recorded in 1948. In relation to travel mileage, deaths from motor vehicle accidents probably reached the lowest level ever experienced.

Catastrophes—accidents in which five or more persons are killed—were slightly more frequent and took a somewhat larger number of lives in the year just ended than in 1948. Records compiled from a variety of sources by the Statistical Bureau of the Metropolitan Life Insurance Company indicate that more than 1,200 persons were killed in catastrophes up to the closing week of 1949. The loss of life was about 150 greater than in 1948, a year which made one of the most favorable showings in the long period covered by the Metropolitan's studies of catastrophes. No disaster so far this year took as many as 100 lives, in this respect paralleling the unusual experience of 1948. Heading the list of catastrophes during 1949 was the fire on April 4th in a hospital at Effingham, Ill., which took the lives of 75 persons. Chain-like tornadoes in January exacted a death toll of 59 in Arkansas and Louisiana. The transport plane crash at Washington, D. C., in November resulted in 55 deaths, the heaviest loss of life in any one crash in the history of civil aviation in the United States.

Marked increases were shown this year as compared with last in the number of catastrophe deaths resulting from motor vehicle accidents, from conflagrations, burns, and explosions, as a group, and from natural disasters—tornadoes, floods, blizzards, etc. Civilian air transportation recorded only a slightly higher number of deaths in the past year than in 1948. On the other hand, there were substantially fewer deaths in major water transportation accidents, and no catastrophic accidents in mines.

In 1949, conflagrations, burns, and explosions together contributed about one

quarter of all catastrophic accidents and about the same proportion of catastrophic fatalities. Motor vehicle accidents accounted for nearly one third of the accidents, but for only a little more than one fifth of the deaths. Natural disasters — tornadoes, floods, blizzards, etc.— were responsible for only one ninth of all the major accidents but for approximately one fifth of the fatalities. Civilian air transportation, which accounted for one eleventh of the catastrophies, contributed about one sixth of the deaths.

There were six disasters in 1949 which took 25 or more lives. The aggregate of lives lost in such accidents was 278, or nearly one quarter of the total for all catastrophes. Last year there were likewise six disasters of this magnitude, which accounted for 228 lives.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., December, 1949.

CHANGE OF ADDRESS AND NEW LOCATIONS

Abar, J. Weston, from Harrisburg, Pa., to Osteopathic Hospital of Rhode Island, 1763 Broad St., Edgewood, Cranston 5, R. I.

Abell, R. Z., Jr., from 1641 Broadway, to Route 7, Lubbock, Texas

Adams, Warren P., from Gardiner, Maine, to 23230 Mack Ave., St. Clair Shores, Mich.

Adler, William V., PCO '49; Los Angeles County Osteopathic Hospital, 1100 N. Mission Road, Los Angeles 33, Calif.

Aho, Toivo John, CCO '49; Lakeview Hospital, 1749 N. Prospect Ave., Milwaukee 2, Wis.

Allen, Newton C., from Lewistown, Pa., to 400 Granite Bldg., 313 Sixth Ave., Pittsburgh 22, Pa.

Almquist, Richard T., from 400 N. W. 23rd St., to 216½ W. Commerce St., Oklahoma City 9, Okla.

Bamel, Solomon, CCO '49; Chicago Osteopathic Hospital, 5250 S. Ellis Ave., Chicago 15, Ill.

Berry, Mary Heard, from Calhoun, Ga., to 565 Lee St., S. W., Atlanta, Ga.

Best, F. W., from 3803 N. Fourth St., to 3804 N. Fourth St., Albuquerque, N. Mex.

Bortle, Donald T., from Cranston, R. I., to 411 W. Shore Road, Warwick, R. I.

Brodsky, Samuel H., from Bay Village, Ohio, to 1708 S. Second St., Philadelphia 48, Pa.

Bronsky, Maurice L., KC '50; Osteopathic Hospital of Maine, 335 Brighton Ave., Portland 4, Maine

Buchanan, Jerry Rucker, KCOS '49; 914 W. Yakima Ave., Yakima, Wash.

Calmar, J. Thomas, from 1120 E. Broward Blvd., to 1926 E. Sunrise Blvd., Fort Lauderdale, Fla.

Campbell, Jerome, from Lake Wales, Fla., to 757 Fourth St., N., St. Petersburg 4, Fla.

Carter, Marjorie E., from 10½ S. Lewis Ave., to 756 S. Allegheny, Tulsa 4, Okla.

Cassity, Elton E., KC '49; Purdin, Mo.

Catanese, Joseph, from 5135 Chancellor St., to 7201 Hanford St., Philadelphia 24, Pa.

Clark, Fred R., from Lincoln Park, Mich., to Wheaton Hospital, Wheaton, Mo.

Covolus, John J., CCO '49; Lancaster Osteopathic Hospital, Lancaster, Pa.

Crabb, Samuel L., KC '49; Hillside Hospital, 1940 E. Cajon Blvd., San Diego 3, Calif.

Dannin, Arthur E., KCOS '50; Grandview Hospital, 405 Grand Ave., Dayton 5, Ohio

Dirlam, K. M., from Des Moines, Iowa, to Massena, Iowa

DiSantis, Warren V., KC '49; Dallas General Hospital, 5003 Ross Ave., Dallas 6, Texas

Dodge, John W., from 110½ Broadway, to 510 Black Bldg., Fargo, N. Dak.

Downing, Bradley C., from 27 E. Monroe St., to 16 N. Wabash Ave., Chicago 2, Ill.

Dozier, Thomas C., from Muskegon, Mich., to Seagoville, Texas

Dresser, Harold E., from Philadelphia, Pa., to 720-22 Sixth Ave., Des Moines 9, Iowa

Dressler, Otterbein, from Philadelphia, Pa., to 159 Owen Ave., Lansdowne, Pa.

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Edwards, Edward B. M., KC '50; Corpus Christi Osteopathic Hospital, 1202 Third St., Corpus Christi, Texas

Eshleman, Joseph L., from Norridgewock, Maine, to East Berlin, Pa.

Fazio, Charles S., KC '49; 1812 Pendleton Ave., Kansas City 1, Mo.

Felder, Frank, from 1806 S. Broadway, to 1916a S. Broadway, St. Louis 4, Mo.

Fischer, E. P., KC '49; Freedom, Okla.

Friedman, Robert, PCO '49; 25 N. Jefferson St., Allentown, Pa.

Gaytan, Ralph G., from 1347 E. Valley Blvd., to 12255 E. Valley Blvd., El Monte, Calif.

Gerlach, Marcus S., from Monrovia, Calif., to 2015 State St., Santa Barbara, Calif.

Gibbs, Edward H., from Jackson Heights, N. Y., to 88-17 Whitney Ave., Elmhurst, L. I., N. Y.

Gregory, W. R., from Reading, Pa., to Flint General Hospital, 765 E. Hamilton Ave., Flint 5, Mich.

Hammer, C. E., KC '49; Gleason Hospital, 523 Main St., Larned, Kans.

Hixson, Heber, from Kansas City, Mo., to 4420 N. Second St., Albuquerque, N. Mex.

Hobart, Thomas M., from 5008 Columbia Ave., to 6117 Berkshire Lane, Dallas 9, Texas

Hughes, James J., from 3456 Almond St., to 5928 Erdrick St., Philadelphia 24, Pa.

Jackson, Cecil B., from Plymouth, Mich., to 146 N. Center St., Northville, Mich.

Jones, James E., from Tulsa, Okla., to Pryor Clinic, 6 N. Rowe, Pryor, Okla.

Kaelber, F. M., from Pelham, N. Y., to Little Buck Ranch, Babson Park, Fla.

Kane, Elliot C., PCO '49; Los Angeles County Osteopathic Hospital, 1100 N. Mission Road, Los Angeles 33, Calif.

Kellman, Milton, CCO '49; 15393 Mendota Ave., Detroit 21, Mich.

Kitchen, Neil R., from Detroit, Mich., to 13535 Woodward Ave., Highland Park 3, Mich.

Knouse, Charles Allison, KC '49; 4127 E. Sixth St., Kansas City 1, Mo.

Lambert, Charles F., KC '50; 3715 Summit St., Kansas City 2, Mo.

Landis, Joel J., from 900 N. LaBrea Ave., to 1512 Centinela Ave., Inglewood, Calif.

Lauterbach, Otto E., from 151 N. Fairfax Ave., to 471 S. Fairfax Ave., Los Angeles 36, Calif.

Lippman, Mervin R., from 4223 S. Benton Blvd., to Ambassador Hotel, 3650 Broadway, Kansas City 2, Mo.

Lockward, William H., from Tatum, N. Mex., to Glendale, Ariz.

Loken, Arnold B., KC '50; 419 Brooklyn Ave., Kansas City 1, Mo.

Mackenzie, A. S., from Detroit, Mich., to Madison Street Hospital, 1620 18th St., Seattle 22, Wash.

Markle, Raymond G., from 14 South Ave., to 247 N. Gratiot Ave., Mount Clemens, Mich.

McGowan, Thomas B., from Langhorne, Pa., to 1921 Morris Ave., New York 53, N. Y.

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Mennen, Paul, KC '50; Glendale Community Hospital, 1100 E. Windsor Road, Glendale 5, Calif.

Morehead, Robert L., from Bethany, Mo., to Box 236, Flatonia, Texas

Neufeld, Newton D., KC '49; Box 244, Mansfield, Mo.

Nichols, Arthur E., KC '49; 3620 Monroe Ave., Kansas City 3, Mo.

Olen, Henry F., KC '49; Grand Rapids Osteopathic Hospital, 1225 Lake Drive, S. E., Grand Rapids 6, Mich.

Orr, Charles H., from Pasadena, Calif., to 1947 E. Las Tunas Drive, Temple City, Calif.

Pearce, Douglas I., from Trenton, Mo., to Axtell Osteopathic Hospital, 205 S. Broadway, Princeton, Mo.

Pearson, Robert B., from Sedgwick, Maine, to Louisiana, Mo.

Purtill, Mabel M., from Reno., Nev., to 2634 Walnut St., Huntington Park, Calif.

Reed, William E., from 9754 E. Oak Ave., to 9741 E. Oak Ave., Bellflower, Calif.

Rogers, John Courtney, KCSO '49; Massachusetts Osteopathic Hospital, 43 Evergreen St., Jamaica Plain, Boston 30, Mass.

Rosenberg, Paul R., KC '49; Glendale Community Hospital, 1100 E. Windsor Road, Glendale 5, Calif.

Salerno, Alphonse, PCO '48; 122 Park Ave., East Orange, N. J.

Schaffle, Margaret H., from Detroit, Mich., to Riverside Osteopathic Hospital, 165 George St., Trenton, Mich.

Segal, Seymour S., from Brooklyn, N. Y., to 144-46 77th Road, Kew Garden Hills, N. Y.

Sieg, E. E., from 3362 Main St., to Anos Bldg., 3159 Main St., Weirton, W. Va.

Silvers, Leon K., from 1203 S. Agnew St., to 2004 S. Agnew St., Oklahoma City 8, Okla.

Simmer, John N., from Grand Rapids, Mich., to Middleville, Mich.

Smith, Calvin B., KC '50; 930 W. Second St., Joplin, Mo.

Smith, Crews Z., KC '50; 541 Brooklyn Ave., Kansas City 1, Mo.

Teel, H. Ivan, KC '49; Doctors Hospital, 1087 Dennison Ave., Columbus 1, Ohio

de Tilleman, V. A., from London, England, to 188 St. Clair Ave., E., Toronto 5, Ont., Canada.

Tomayko, William A., from Detroit, Mich., to 511 N. W. 49th St., Miami 37, Fla.

Torello, J. Antonio, PCO '49; Avondale, Pa.

Wright, Charles B., from 1727 Independence Ave., to 605 Woodland Ave., Kansas City 1, Mo.

Young, Donald C., KC '50; Houston Osteopathic Hospital, 5115 Montrose Blvd., Houston 6, Texas

Youngs, Leonard S., KC '49; Los Angeles County Osteopathic Hospital, 1100 N. Mission Road, Los Angeles 33, Calif.

Books Received

CLINICAL NUTRITION. Edited by Norman Joliffe, M.D.; F. F. Tisdell, M.D.; and Paul R. Cannon, M.D., for the Food and Nutrition Board of the National Research Council. Cloth. Pp. 925, with illustrations. Price $12.00. Paul B. Hoeber, Inc., 49 East 33rd St., New York 16, 1950.

THE PATHOLOGY OF ARTICULAR AND SPINAL DISEASES. By Douglas H. Collins, O.B.E., M.D. (liverp.), Reader in Clinical Pathology in the University of Leeds. Formerly: Rheumatism Research Fellow in the University of Leeds; E.M.S. Pathologist and Medical Superintendent, Wharncliffe Hospital, Sheffield; Junior Lecturer and Holt Fellow in Pathology in the University of Liverpool. Cloth. Pp. 332, with illustrations. Price $7.00. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, 1950.

HANDBOOK OF PHYSICAL MEDICINE AND REHABILITATION. By The Council on Physical Medicine and Rehabilitation of the American Medical Association and 29 Contributors. Cloth. Pp. 573, with illustrations. Price $4.25. The Blakiston Company, 1012 Walnut St., Philadelphia 5, 1950.

INFRARED RADIATION THERAPY SOURCES AND THEIR ANALYSIS WITH SCANNER. By Leopold Rovner, Consulting Physicist, Cambridge, Massachusetts. Paper. Pp. 34, with illustrations. Price $1.50. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1950.

PROCTOLOGY IN GENERAL PRACTICE. By J. Peerman Nesselrod, B.S., M.S., M.Sc. (Med.), M.D., F.A.C.S., F.A.P.S., Associate in Surgery, Northwestern University Medical School; Associate of Surgical Division of Proctology, Evanston Hospital, Evanston, Ill.; Certified by the Central Certifying Committee in Proctology (Founders' Group) of the American Board of Surgery; Commander (MC) USNR. Cloth. Pp. 276, with illustrations. Price $6.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1950.

PARKINSON'S DISEASE. By Walter Buchler. Paper. Pp. 82. Price $1.00 net, $2.00 Cloth. Walter Buchler, 101 Leeside Crescent, London, N.W. 11, England, 1950.

AMPUTATION PROSTHETIC SERVICE. By Earle H. Daniel, Director of Prosthetic Service, Institute of Physical Medicine and Rehabilitation, New York University, Bellevue Medical Center. Prosthetic Consultant to: Bellevue, City, Goldwater Memorial, Metropolitan and University Hospitals, New York, New York. Cloth. Pp. 327, with illustrations. Price $7.00. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, 1950.

TEXTBOOK OF BACTERIOLOGY. By Joseph M. Dougherty, A.B., M.A., Ph.D., Dean of the School of Science and Professor of Bacteriology, Villanova College; Fellow of the American Association for the Advancement of Science, and Anthony J. Lamberti, B.S., M.S., Instructor in Bacteriology and Parasitology, Temple University School of Medicine; Formerly Instructor in Bacteriology, Villanova College; Member of the American Public Health Association. Ed. 2. Cloth. Pp. 492, with illustrations. Price $5.75. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1950.

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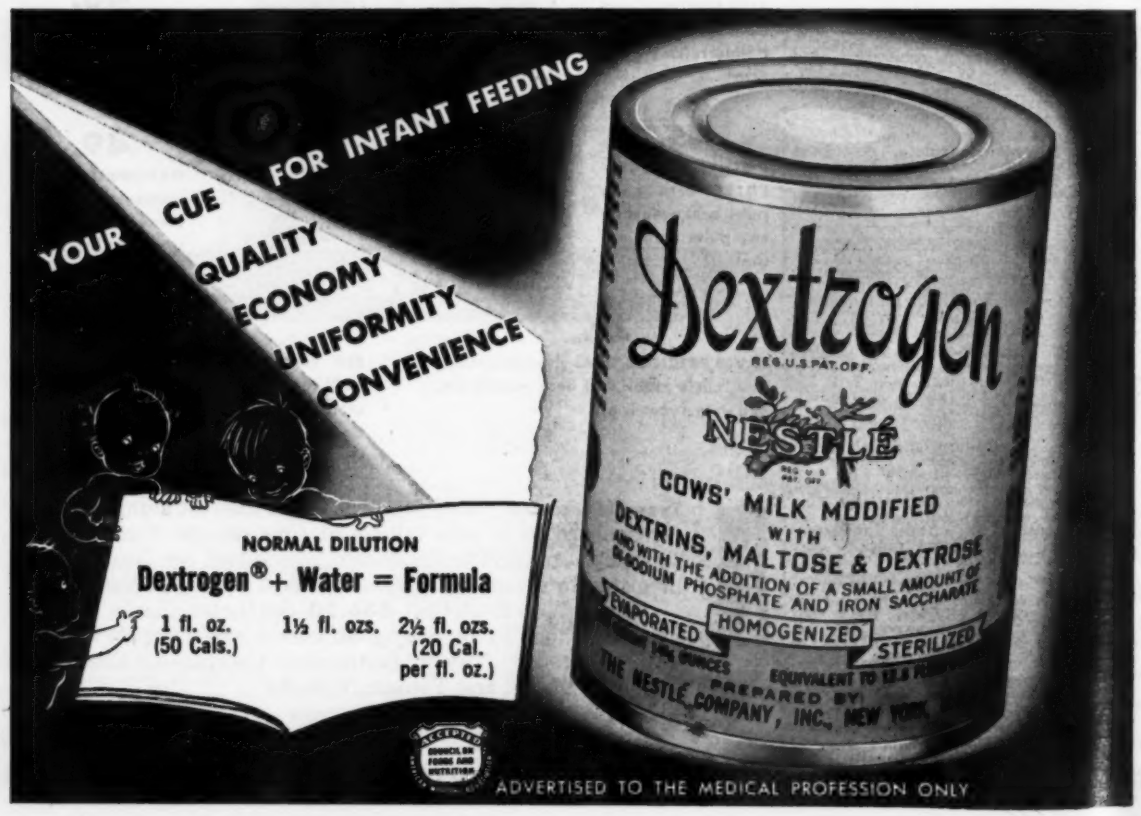

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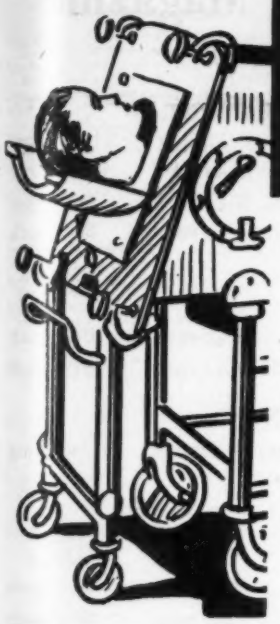

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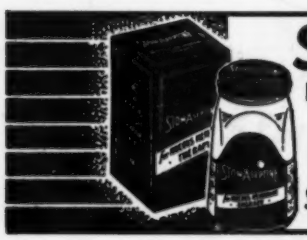

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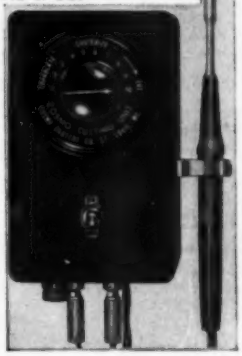

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